Defence Research and Development Canada
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Helicopter Maritime Environment Trainer: Software Test Document

Edited by:

Leo Boutette

Ken Ueno

Jason Dielschneider

This manual represents the operation of the HelMET System as originally installed with hardware updates to the current date. For current system start-up procedures consult the Helicopter Maritime Environment Trainer (HelMET) Start-Up, Virtual Lesson Plan (VLP) Editor & Shutdown Manual Application Version 4.0. For current Operational Procedures consult the Helmet 4 4 IOS User's Guide _Rev_011.

Defence R&D Canada
Technical Memorandum
DRDC Toronto TM 2011-048
June 2011

Canada

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Principal Author

Original signed by See Original Document. Edited by: Leo Boutette; Ken Ueno; Jason Dielschneider

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See Original Document. Edited by: Leo Boutette; Ken Ueno; Jason Dielschneider

Human Effectiveness Exploitation Centre

Approved by

Original signed by David Eaton

David Eaton

Section Head, Human Effectiveness Exploitation Centre

Approved for release by

Original signed by Dr. Stergios Stergiopoulos

Dr. Stergios Stergiopoulos

Acting Chair, Knowledge and Management Information Committee

Acting Chief Scientist

This document is a revision of DRDC Toronto Document: CR 2002-027 Atlantis Document: ED990-01155 titled Helicopter Maritime Environment Trainer: Software Test Description with updates to Version 4.4 of the HelMET software.

Abstract

The Helicopter Maritime Environment Trainer (HelMET) was developed by Defence R&D Canada – Toronto (DRDC Toronto) for training helicopter pilots to land on the flight deck of a Canadian Patrol Frigate (CPF) in a virtual environment. The HelMET was installed at 12 Wing, Canadian Forces Base (CFB) Shearwater, Nova Scotia, Canada [reference: Summary per document cited in next paragraph].

DRDC Toronto Document: CR2002-027 Atlantis Document: ED990-01155 titled Helicopter Maritime Environment Trainer: Software Test Description documented Version 1.1 of the HelMET Software.

As third party support for the HelMET system did not come to fruition, DRDC Toronto has been supporting the HelMET system at 12th Wing Shearwater with hardware and software updates. The current version of HelMET is Version 4.4. Many of the updates implemented were made to allow the simulator to be used as a procedures trainer.

This document is a revision of CR2002-027 updated to reflect the large number of changes that have been implemented by DRDC Toronto since version 1.1. The purpose of this document is to update the description so that the system can be maintained and operated by Director Aerospace Development Program Management, Radar and Communications Systems or its representatives.

Résumé

Le Simulateur d’entraînement virtuel pour hélicoptère maritime (HelMET) a été développé par Recherche et développement pour la défense Canada – Toronto (RDDC Toronto) afin d’entraîner les pilotes d’hélicoptère à l’atterrissage sur le pont d’envol d’une frégate canadienne de patrouille dans un environnement virtuel. Le système HelMET a été installé à la 12e Escadre, Base des Forces canadiennes Shearwater, Nouvelle-Écosse, Canada [référence : sommaire par document cité dans le paragraphe suivant].

Document RDDC Toronto : CR2002-027, document Atlantis : ED990-01155 intitulé Simulateur d’entraînement virtuel pour hélicoptère maritime : Description de test de logiciel, documentation de la version 1.1 du logiciel HelMET.

Étant donné que la prise en charge du système HelMET par un tiers ne s’est pas réalisée, c’est RDDC Toronto qui en assure, par conséquent, le soutien à la 12e Escadre Shearwater au moyen de mises à niveau de matériel et de mises à jour de logiciel. La dernière version du logiciel HelMET est la version 4.4. De nombreuses fonctionnalités qui ont été implémentées visaient à permettre au simulateur d’être utilisé comme système d’entraînement aux procédures.

Le présent document est une révision du document CR2002-027 dont la mise à jour vise à refléter le grand nombre de modifications apportées au logiciel par RDDC Toronto depuis la version 1.1.

L’objectif de ce document est de mettre à jour les descriptions de façon à ce que le système puisse être maintenu et utilisé par le Directeur – Gestion du programme de développement aérospatial (système de radar et de communication) ou ses représentants.

Executive summary

Helicopter Maritime Environment Trainer: Software Test Document:

Leo Boutette; DRDC Toronto TM 2011-048; Defence R&D Canada – Toronto; June 2011.

Introduction or background:

The Helicopter Maritime Environment Trainer (HelMET) was developed by Defence R&D Canada – Toronto (DRDC Toronto) for training helicopter pilots to land on the flight deck of a Canadian Patrol Frigate (CPF) in a virtual environment. The HelMET was installed at 12 Wing, Canadian Forces Base (CFB) Shearwater, Nova Scotia, Canada [reference: Summary per document cited in next paragraph].

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Sommaire

Helicopter Maritime Environment Trainer: Software Test Document:

Leo Boutette; DRDC Toronto TM 2011-048; R & D pour la défense Canada – Toronto; Juin 2011.

Le Simulateur d’entraînement virtuel pour hélicoptère maritime (HelMET) a été développé par Recherche et développement pour la défense Canada – Toronto (RDDC Toronto) afin d’entraîner les pilotes d’hélicoptère à l’atterrissage sur le pont d’envol d’une frégate canadienne de patrouille dans un environnement virtuel. Le système HelMET a été installé à la 12e Escadre, Base des Forces canadiennes Shearwater, Nouvelle-Écosse, Canada [référence : sommaire par document cité dans le paragraphe suivant].

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1 Scope

1.1 Identification

This Software Test Document (STD) describes the test preparations, test cases, and test procedures that were used for qualification testing of the Helicopter Maritime Environment Trainer (HelMET) system, software, and user interface. This STD was intended for conducting the In Factory Baseline Test and the Post Delivery Validation of the HelMET. The In Factory Baseline Test was conducted at Defence R&D Canada - Toronto (DRDC Toronto), Toronto, Ontario, Canada. These test procedures could be repeated at the Post Delivery Validation (PDV) following the HelMET installation at CFB Shearwater, Nova Scotia, Canada.

The HelMET was developed by DRDC Toronto to train helicopter pilots to land on the flight deck of a Canadian Patrol Frigate (CPF) in a virtual environment. The HelMET is also referred to as the simulator, Helicopter Deck Landing Simulator (HDLS), Virtual Reconfigurable Simulator (VR-Sim), or Reconfigurable Helicopter Simulator(RHS).

1.2 System Overview

1.2.1 Background

Currently, Canadian Forces (CF) pilots flying the Sea King helicopter learn to land on the flight deck of a CPF through practice at sea. Although the training community has used a Sea King helicopter simulator at CFB Shearwater for more than thirty years, it does not have a visual display and consequently cannot be used for training visually guided tasks. Modern simulators are available with non-HUD visual displays, most often expensive to procure and maintain. The acquisition cost of a typical commercial simulator can exceed $20 million Canadian. Although expensive, high-end simulators are cost-effective for some training operations when the high costs and risks associated with operational training are considered. However, the large acquisition price, the high maintenance costs, the small maritime pilot population and limited Sea King lifespan, as well as geographical considerations are likely factors that dissuade the purchase of high-end simulators for training deck landing skills.

In 1994, DRDC Toronto was requested by CF to investigate the potential use of low cost, virtual reality technologies for this purpose, following a successful demonstration of these technologies for training ship handling skills and reductions of sea time.

Landing on the deck of a CPF in high sea states is considered one of the most challenging visually guided tasks performed by any helicopter pilot in the CF. It requires fine motor skills, exceptional judgement and precise manoeuvring techniques. Moreover, good depth perception is an essential element and a necessity for this task as the helicopter blades are within 5 metres of the ship's hangar face in the properly landed position. The physics-based modelling aspects are also formidable challenges, since in addition to the aerodynamic modelling of the Sea King, the modelling of the ship's dynamics, interactions with the wind as affected by the ship's superstructure, as well as modelling of the undercarriage and its contact with the deck surface must be included.

The simulator design goals are to include affordability, portability, modularity and low maintenance. Low cost can be partially achieved by employing commercial off-the-shelf (COTS) components intended for the entertainment market, rather than components specialized for high-end simulators.

A detailed description of the HelMET/HDLS development can be found in [References a, b in Referenced Documents].

1.2.2 Simulator General Description

The simulator design builds on common COTS components supplemented with specific aircraft parts from the Sea King helicopter. The Pilot Station includes an adjustable Sea King seat and primary flight control equipment linked to the Simulation Computer Subsystem and various subsystems for sensory cueing. The Simulation Computer Subsystem, flight control components, and other subsystems are further discussed, along with their general characteristics. The pilot's flight controls, including tail rotor pedals, collective pitch lever, and cyclic pitch stick were obtained from the CF supply system or were built from technical drawings. Sensory cues are provided by a visual subsystem, motion platform subsystem, and sound and vibration subsystems. Control of pilot training is conducted via the Instructor Operator Station and Audio Communication Subsystem.

The simulator system block diagram is shown in

Figure 1. The simulator consists of the following major subsystems [References a, b in Referenced Documents]:

- Motion Platform Subsystem

- Flight Control Component Subsystem
- Visual Subsystem
- Video Distribution Subsystem
- Sound Subsystem
- Vibration Subsystem
- Audio Communication Subsystem
- Simulation Computer Subsystem
- Instructor Operator Station Subsystem
- Landing Signals Officer Station Subsystem
- Local Area Network.

The Motion Platform Subsystem, a six-degree of freedom (DOF) motion base unit, provides the necessary motion cues (roll, pitch, yaw, heave, surge and sway) for a simulated helicopter.

The Flight Control Component Subsystem provides user control interfaces to three unique flight control characteristics: the vertical control, the horizontal control, and the heading control.

The Visual Subsystem provides the pilot with a view of simulated environment. It consists of a head tracking device, an image generator, and a head mounted display. The head tracking device determines the position and orientation of the pilot's head, which is used to determine his/her point of view. These measurements are passed to the image generator that renders the images within this field of view (FOV), and transmits the images to the Video Distribution Subsystem.

The Video Distribution Subsystem accepts display images in RGB video signals from the Image Generator and distributes images to the HMD display for pilot viewing and the Instructor Operator Station display repeater for instructor viewing.

The Sound Subsystem drives the sound and vibration subsystems' speakers and delivers continuous auditory cues as a function of the Sea King's simulated flight regime based on data received from the Simulation Computer Subsystem.

Like the Sound Subsystem, the Vibration Subsystem provides continuous cues to supplement the Motion Platform Subsystem. The Vibration Subsystem is to provide the higher frequency vibration environments that are not normally provided through the Motion Platform Subsystem.

The Audio Subsystem provides the necessary audio communication interfaces between the pilot and IOS operator.

The Simulation Computer Subsystem executes the helicopter simulation model and management utilities, uses the pilot's controls to calculate the motion dynamics, determines the pilot's point of view from tracking head movements and generates the graphics for the pilot's visual display and the Instructor Operator Station repeater monitors.

The Instructor Operator Station communicates with the Simulation Computer Subsystem for the simulation control.

The Landing Signals Officer Station communicates with the Simulation Computer Subsystem for the simulation status and provides the Landing Signals office with visual representation of the virtual scene. It also accepts input via the LSO console and provides this data to the simulation computer to update the simulation..

The Simulation Local Area Network provides communication among the five major computers (Motion Platform Control Computer, Simulation Computer, IOS Computer, LSO Computer, Audio Subsystem Computer 1 – Digital Audio Cues and Audio Subsystem Computer 2 – Vibration and Audio Effects) that host the applications software for the simulation.

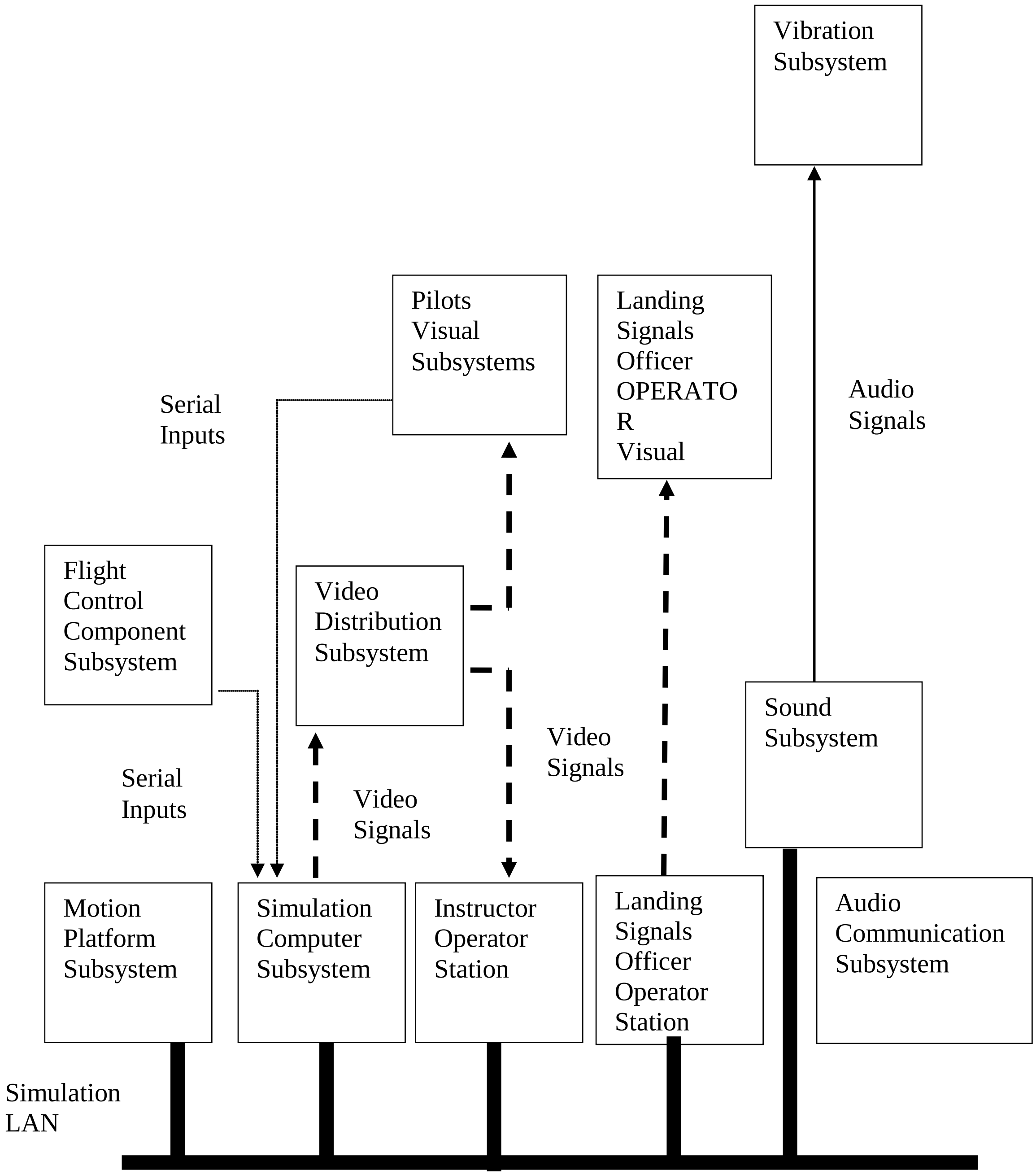

Figure 1 Simulator System Block Diagram

1.2.3 Document Overview

This document describes the simulator system and three test scenarios to be used for system qualification testing. A brief outline of the contents of this document is given below:

Section 1 – Scope

This section describes the identification, system overview, and document overview for the simulator.

Section 2 – Referenced Documents

This section lists by document number, title, revision, and date all documents referenced in this document.

Section 3 – HelMET VLP Test Preparations

This section presents a brief description of preparation of the Virtual Lesson Plans from the Operational Sequence Diagrams.

Section 4 – Manual Operation Test Preparation

This section presents a brief description of hardware preparation, software preparation, and other pre-test preparations.

Section 5 – Manual Operation Test Descriptions

This section describes the prerequisite conditions, test inputs, expected test results, criteria for evaluating results, assumptions, and constraints for each test case.

Section 6 – Notes

This section contains general information.

2 Referenced Documents

The following government and non-government documents are referenced in this document:

a.	DRDC Toronto Specification	Helicopter Deck Landing Simulator & Landing Signalling Officer Simulator Preliminary Specification (Updated)
b.	DRDC Toronto Report	Helicopter Deck Landing Simulator: Technology Demonstrator by F.A. Lue And L.E. Magee
c.	DRDC Toronto/12 Wing	Operational Sequence Diagram (OSD): Daytime Freedeck Launch
d.	DRDC Toronto/12 Wing	Operational Sequence Diagram (OSD): Night Time Freedeck Recovery
e.	DRDC Toronto/12 Wing	Operational Sequence Diagram (OSD): Daytime Hauldown Recovery
f.	C-12-124-A00/MB-000	Aircraft Operating Instructions, CH124 Sea King Helicopter, 2000
g.	CFTO B-06-282-000/FP-000	Shipborne Helicopter Operating Procedures
h.	DRDC Toronto CR 2002-022	Helicopter Maritime Environment Trainer Operator Manual
i.	DRDC Toronto CR 2002-030	Helicopter Maritime Environment Trainer Version Description Document
j.	Tyan	B4985 Transport FT48 Service Engineers Manual Barebone System
k.	Dell	Dell Precision 530 User's Guide
l.	Servos and Simulation, Inc.	Six Degree of Freedom Motion Platform, Maintenance Document, October 1997
m.	BG Systems, Inc.	CerealBox Hardware Manual, 4.02, November 1998
n.	BG Systems, Inc.	LV824 Software Manual, 4.03, June 1999

o.	Polhemus Inc.	3SPACE FASTRAK User's Manual, Revision F, November, 1993
p.	Virtual Research Systems, Inc.	VR1280 User Guide
q.	Yamaha	DEQ7 Digital Equalizer Operating Manual
r.	BSS Audio Ltd.	FDS 360 User's Manual
s.	NVIS, Inc	NVISION SX User Guide,

3 HelMET VLP Test Preparations

The current version of the HelMET simulation is an advanced after-action review version of the fully interactive manual version derived from the original delivery to Shearwater. The original software test procedure was based upon the supported scenario modes of freedeck and hauldown, and day or night. The VLP test procedure is based upon the current established VLPs :

- OSD A: daytime, mild sea, approach and free deck landing
- OSD B: daytime, moderate sea, radial approach and hauldown
- OSD C: nighttime, moderate sea, hauldown
- OSD D: nighttime, moderate sea, freedeck landing
- OSD E: daytime, moderate sea, untethered take-off
- OSD F: nighttime, fog and high seas, untethered take-off
- OSD G: nighttime, moderate seas, untethered take-off
- OSD H: nighttime, mild sea, instrument flight conditions (IFC) approach

The software test document is derived from the operator manual, and is a direct reflection of the operation process plus the gross visual verification of the state of the simulation at each stage. It is unknown if the typical visual state of the stages of operation in the initial product delivery were fully verified with the Operational Sequence Diagrams (OSD) that reflect the different modes of operation of the original simulation. This would require a fully trained pilot referring to the referenced OSDs since even the OSDs were not being fully followed in practice. The same approach must be undertaken in the production of a properly updated test for the VLP version of the simulation. It is possible that 12 Wing has performed some of this analysis. As such, a fully elaborated test procedure is outside the scope of the current version of this document. If a fully elaborated test document is required, the reader is urged to consult the updated operator manual and its referenced documents.

The manual operation software test is still valid for the manual operational mode of the simulation, as elaborated below.

4 Manual Operation Test Preparations

Three basic test scenarios are used to exercise the capabilities of the simulator system. These test scenarios are:

- Daytime Freedeck Launch
- Night Time Freedeck Recovery
- Daytime Hauldown Recovery.

Three basic scenarios, which are described in the DRDC Toronto/12 Wing Operational Sequence Diagrams (OSD) [References c, d, e], are used to generate various test cases for the above scenarios. These three basic scenarios are derived from the Shipborne Helicopter Operating Procedures [Reference g] and CH 124 Sea King Aircraft Operating Instructions [Reference f].

4.1 Daytime Freedeck Launch Scenario

The Daytime Freedeck Launch scenario exercises the simulator capabilities to launch a Sea King helicopter from the flight deck of a CPF in daytime in a virtual environment.

4.1.1 Hardware Preparation

4.1.1.1 Simulator Hardware Used

The following simulator subsystems are used to conduct the Daytime Freedeck Launch scenario test:

- Local Area Network
- Simulation Computer Subsystem
- Instructor Operator Station Subsystem
- Audio Subsystem
- Visual Subsystem
- Video Distribution Subsystem
- Sound Subsystem
- Vibration Subsystem
- Flight Control Component Subsystem

- Motion Platform Subsystem.

The Operator Manual [Reference h] provides detailed descriptions of these subsystems.

4.1.1.2 Simulator Hardware Power-On Instructions

The following procedures are used to power on the simulator hardware:

- Power on the Simulation Computer Subsystem
- Power on the IOS Computer Subsystem
- Power on the Audio Communication Subsystem
- Power on the Sound and Vibration Subsystems
- Power on the Flight Control Component Subsystem
- Power on the Visual Subsystem
- Power on the Motion Platform Subsystem.

4.1.1.2.1 Simulation Computer Subsystem Power-On Sequences

4.1.1.2.1.1 Simulation Computer Subsystem Power-On Procedures

- The Simulation Computer Subsystem power-on procedures are:
- Turn Administration Station power bar switch to ON.
- Turn IOS power bar switch to ON.
- Ensure that the UPS is plugged in.
- Turn on the master power bar switch at the rear of UPS by lifting switch up.
- Wait for the “On-Line” message to display.
- Turn the Circuit Breaker2 power switch to the “I/ON”.
- Push the Simulation Computer main power switch located behind the drop down front panel cover.
- Turn on the Simulation Computer monitor (PILOT CPU/PILOT LEFT EYE VIEW monitor).
- Monitor the Simulation Computer boot-up sequence on the Simulation Computer monitor.
- Monitor system start-up sequence.

- Enter the account name i.e. vrsim
- Enter the password i.e. sea_king.

4.1.1.2.2 IOS Computer Power-On Sequences

The IOS Computer power-on sequences are described in the Dell Precision 530 User's Guide [Reference k].

4.1.1.2.2.1 IOS Computer Subsystem Power-On Procedures

- The IOS Computer power-on procedures are:
- Turn on the IOS Monitor.
- Turn on the IOS Computer (IOS CPU) by pressing the POWER button.
- Ensure that the green Power LED is illuminated.
- Go to the IOS Monitor located at the Instructor Operator Station.
- Enter the account name i.e. vrsim
- Enter the password i.e. sea_king.
- Ensure that the CerealBox Power green LED is illuminated.

4.1.1.2.3 Audio Subsystem Power-On Sequences

4.1.1.2.3.1 Audio Subsystem Power-On Procedures

The Audio Subsystem power-on procedures are:

- Turn the Audio Subsystem power bar 2 switch to ON.
- Turn on the Audio Subsystem Computer 1 monitor by pressing the POWER button.
- Turn on the Audio Subsystem Computer 1 by pressing the POWER button.
- Monitor the boot-up sequence.
- Enter "vrsim" to logon.
- Enter the password i.e. sea_king.
- Turn on the Audio Subsystem Computer 2 monitor by pressing the POWER button.

- Turn on the Audio Subsystem Computer 2 by pressing the POWER button.
- Monitor the boot-up sequence.
- Enter “vrsim” to login.
- Enter the password i.e. sea_king.

4.1.1.2.4 Sound and Vibration Subsystems Power-On Sequences

The Sound and Vibration Subsystems power-on sequences are described in the Yamaha Digital Equalizer Operating Manual [Reference q] and BSS FDS 360 User’s Manual [Reference r].

4.1.1.2.4.1 Sound and Vibration Subsystems Equipment Station1 Rack Power-On Procedures

The Sound and Vibration Subsystems Equipment Rack Station1 power-on procedures are:

- Turn the Audio Subsystem power bar 1 switch to ON.
- Turn on the Yamaha DEQ7 Digital Equalizer by pressing the POWER button.
- Set the INPUT rotary switch to the 5th hatch mark.
- Turn on the BSS FDS-360 Frequency Dividing System by pressing the POWER button.
- Ensure that the MUTE button for band 1 is lit.
- Set the band 1 level to 2 dB at the right side.
- Ensure that the MUTE button for band 2 is lit.
- Set the band 2 level to 0 dB.
- Ensure that the MUTE button for band 3 is lit.
- Set the band 3 level to 2 dB.
- Ensure that the MUTE button for band 4 is lit.
- Set the band 4 level to 2 dB.
- Turn on the Carver TFM-6CB Power Amplifier by pressing the POWER button.
- Set the L LEVEL switch to the marked position.
- Set the R LEVEL switch to the marked position.
- Turn on the low frequency speaker component by turning the top McIntosh MC 2205 Stereo Power Amplifier POWER switch to “ON”.

- Set the LEFT GAIN switch to the centred position.
- Set the METER RANGE switch to the WATTS position.
- Set the SPEAKERS switch to the ON position.
- Set the RIGHT/MONO GAIN switch to the marked position.
- Turn on the vibration component by turning the bottom McIntosh MC 2205 Stereo Power Amplifier POWER switch to “ON”.
- Set the LEFT GAIN switch to the centred position.
- Set the METER RANGE switch to the WATTS position.
- Set the SPEAKERS switch to the ON position.
- Set the RIGHT/MONO GAIN switch to the marked position.
- Unmute bands 1-4 on the BSS FDS-360 Frequency Dividing System by pressing each MUTE button.
- Go to Equipment Rack 2.

4.1.1.2.5 Flight Control Component Subsystem Power-On Sequences

The Flight Control Component Subsystem power-on sequences are described in the CerealBox Hardware Manual [Reference m].

4.1.1.2.5.1 Flight Control Component Subsystem Power-On Procedures

The Flight Control Component Subsystem power-on procedures are:

- Ensure that the CerealBox Power green LED is illuminated.

4.1.1.2.6 Visual Subsystem Power-On Sequences

The Visual Subsystem power-on sequences are described in the Polhemus FASTRAK User’s Manual [Reference o] and Virtual Research V8 User Guide [Reference s] or the NVIS NVISION SX User Guide [Reference p].

4.1.1.2.6.1 Visual Subsystem Power-On Procedure

The Visual Subsystem power-on procedures are:

- Turn on the NVIS NX-80 by pressing pushing the power switch up.

4.1.1.2.7 Motion Platform Subsystem Power-On Sequences

The Motion Platform Subsystem power-on sequences are described in the Six Degree of Freedom Motion Platform Maintenance Document [Reference l].

4.1.1.2.7.1 Motion Platform Subsystem Power-On Procedures

The Motion Platform Subsystem power-on procedures are:

- Ensure that the Electrical Power Supply Switch Box MAIN POWER handle is in the OFF position.
- Ensure that the Electrical Power Control Panel red S1 EMERGENCY POWER OFF/EMERGENCY STOP button is out.
- Ensure that the STOP button on the Instructor Operator Station is in.
- Open the Motion Platform Control Computer front door by moving the key switch to the unlocked position and pulling the door open.
- Ensure that the red PLATFORM POWER button on the Motion Platform Control Computer is in.
- Ensure that the green PLATFORM ENABLE button on the Motion Platform Control Computer is in.
- Unlock the Electrical Power Supply Switch Box as required.
- Move the Electrical Power Supply Switch Box MAIN POWER handle to the ON position.
- Ensure that the Electrical Power Control Panel L1-MAIN POWER ON light indicator illuminates.
- Turn on the Motion Platform Control Computer display monitor by switching power button located on the right side of the monitor.
- Turn on the Motion Platform Control Computer by setting the on/off position to ON (1).
- Wait for flashing cursor at the end of the “Accept – Attempting” line in the Running window.

At this point, the Motion Platform Control Computer is operational but the power to the Motion Platform motors is not energized and all control inputs from the Motion Platform Control Computer will not cause the Motion Platform Leg Assemblies to move.

- Depress either the Electrical Power Control Panel Emergency Power On/Off button or the Instructor Operator Station Stop button to turn on the solid-state relays (located inside the Electrical Power Control Panel) and allow 220 VAC three-phase electrical power to the EMS motor drives.
- Ensure that all six EMS motor drives are in STOP mode with FREQUENCY REF displayed in the readout panel.
- Ensure that the EMS motor drive LEDs change from the STOP mode to the RUN mode.
- Ensure that the Electrical Power Control Panel L2- Motion power-on light indicator illuminates.

WARNING

At this point, the Motion Platform Subsystem is operational and all control inputs from the Motion Platform Control Computer will cause the Motion Platform Leg Assemblies to move.

4.1.1.3 Simulator Hardware Power-Off Instructions

The following procedures are used to power off the simulator hardware:

- Ensure that the simulator application programs running at the IOS have been exited.
- Power off the Motion Platform Subsystem
- Power off the Visual Subsystem
- Power off the Sound and Vibration Subsystems
- Power off the Audio Subsystem
- Power off the Simulation Computer Subsystem
- Power off the IOS Computer Subsystem.

4.1.1.3.1 Motion Platform Subsystem Power-Off Sequences

The Motion Platform Subsystem power-off sequences are described in the Six Degree of Freedom Motion Platform Maintenance Document [Reference o].

4.1.1.3.1.1 Motion Platform Subsystem Power-Off Procedures

The Motion Platform Subsystem power-off procedures are:

- Ensure that the Electrical Power Control Panel L2 – MOTION POWER ON light is extinguished.
- Turn off the Motion Platform Control Computer power by switching to the OFF (0) position.
- Close the Motion Platform Control Computer front cover door and move the key switch to the locked position.
- Turn off power to the Motion Platform Control Computer display monitor by switching the power button located on the right side of the monitor to the OFF position.

NOTE

A loud ‘bang’ sound will be generated from the following action. Turn off the Electrical Power Control Panel power by moving the Electrical Power Supply Switch Box MAIN POWER handle to the OFF position.

- Ensure that the Electrical Power Control Panel L1-Main power light indicator is off.
- Lockout the Electrical Power Supply Switch Box as required.
- Go to Equipment Rack 2.

At this point, the Motion Platform Subsystem is completely shut down.

4.1.1.3.2 Visual Subsystem Power-Off Sequences

The Visual Subsystem power-off sequences are described in the Polhemus FASTRAK User's Manual [Reference r] and Virtual Research V8 User Guide [Reference s].

4.1.1.3.2.1 Visual Subsystem Power-Off Procedure

The Visual Subsystem power-off procedures are:

- Turn off the Virtual Research V8 HMD power by pushing the power button.

4.1.1.3.3 Sound and Vibration Subsystems Power-Off Sequences

The Sound and Vibration Subsystems power-off sequences are described in the Yamaha Digital Equalizer Operating Manual [Reference u] and BSS FDS 360 User's Manual [Reference v].

4.1.1.3.3.1 Sound and Vibration Subsystems Equipment Rack Station1 Power-Off Procedures

The Sound and Vibration Subsystems Equipment Rack Station1 power-off procedures are:

- Turn off the vibration component by switching the bottom McIntosh MC 2205 Stereo Power Amplifier POWER switch to OFF.
- Turn off the low frequency loudspeaker component by switching the top McIntosh MC 2205 Stereo Power Amplifier POWER switch to OFF.
- Turn off the medium frequency loudspeaker component by pressing the Carver TFM-6CB Power Amplifier POWER button.
- Press and release the BSS FDS-360 Frequency Dividing System POWER button.
- Press and release the Yamaha DEQ7 Digital Equalizer POWER button.
- Turn the Audio Communication System Power Bar 1 switch to OFF.

4.1.1.3.4 Audio Subsystem Power-Off Sequences

4.1.1.3.4.1 Audio Subsystem Power-Off Procedures

The Audio Subsystem power-off procedures are:

- Shutdown the Audio Subsystem Computer 1 by right clicking on desktop and selecting the "logout" option.
- Select the Logout option again from the System Menu.
- Select the Shutdown option from the log-out window.
- Select the "OK" option.
- Wait for the system message "System Halted".
- Turn off the Audio Subsystem Computer 1 by pressing the POWER button.
- Turn off the Audio Subsystem Computer 1 monitor by pressing the POWER button.
- Shutdown the Audio Subsystem Computer 2 by right clicking on desktop and selecting the "logout" option.
- Select the Logout option again from the System Menu.
- Select the Shutdown option from the log-out window.
- Select the "OK" option.
- Wait for the system message "System Halted".
- Turn off the Audio Subsystem Computer 2 by pressing the POWER button.
- Turn off the Audio Subsystem Computer 2 monitor by pressing the POWER button.
- Turn the Audio Subsystem Power Bar 2 switch to OFF.

4.1.1.3.5 Simulation Computer Subsystem Power-Off Sequences

The Simulation Computer Subsystem power-off sequences are described in the Tyan B4985 Transport FT48 Service Engineers Manual Barebone System [Reference m].

4.1.1.3.5.1 Simulation Computer Subsystem Power-off Procedures

The Simulation Computer Subsystem power-off procedures are:

- Click the Actions button on the Task Bar at the top of the screen
- Click log out on the drop down menu

- Click Shut Down on the pop up menu and press enter.
- The computer automatically shuts down.
- Turn off the UPS by pressing any key of front keypad.
- Wait for readout to display.
- Press the right button to scroll to “Turn Off UPS”.
- Press the middle button.
- Wait for readout to display “Shut Down LOAD?”.
- Press the right button.
- Wait for display to extinguish.
- Select Shutdown from the UPS display menu.
- Turn off the UPS by switching the rear power bar switch to the “OFF” position.
- Turn off the Simulation Computer display monitor.

NOTE

To cut off all electrical power to the deskside system, the user can unplug the power cable from the socket. The deskside system should be completely powered off only for relocation, routine maintenance, repair, or exceptional environmental conditions that violate the computer’s operating regime.

4.1.1.3.6 IOS Computer Power-Off Sequences

The IOS Computer power-off sequences are described in the DELL Precision 530 User’s Guide [Reference n].

4.1.1.3.6.1 IOS Computer Subsystem Power-Off Procedures

The IOS Computer Subsystem power-off procedures are:

- Click the Red Fedora icon on the Task bar
- Click Log Out
- Select the Shutdown option from the log-out window.
- Select the “OK” option.

- Wait for the system to shutdown indicated by a black screen.
- Turn off the IOS Computer monitor by pressing the POWER button.
- Turn the Administration Station power bar switch to OFF.

4.1.2 Software Preparation

The software preparation is applicable to the following computers:

- Simulation Computer
- IOS Computer
- Audio Subsystem Computer1
- Audio Subsystem Computer2
- Motion Platform Control Computer.

4.1.2.1 Simulation Computer Software Preparation

4.1.2.1.1 Simulation Computer Software Packages

The following software packages are required to run the Simulation Computer software:

- RedHawk Linux 4.0
- OpenGL SGI Performer for Linux 3.1.1
- HelMET Operational Software CSCI – Linux

4.1.2.1.2 Storage Media

The Simulation Computer software packages are provided on a CD-ROM disk.

4.1.2.1.3 Software Loading Instructions

Normally, the Simulation Computer software packages are already installed in the system. Information on loading software on the Simulation Computer is described in the HelMET Version Description Document [Reference l].

4.1.2.1.4 Software Initialization Instructions

The following procedures are used to initialise the Simulation Computer software:

- Assume that the Motion Platform Control Computer software has been loaded.
- If the Launch_RTI icon has not been started, double-click the Launch_RTI icon on the IOS display monitor to start the HLA for the simulator.
- The Simulation Computer software is started by double-clicking on the VR_Sim_Pilot icon on the IOS display monitor located at the Instructor Operator Station.
- The HelMET Pilot Control Main Window is displayed on the IOS display monitor after a few seconds.

At this point, the Simulation Computer software is operational.

4.1.2.2 IOS Computer Software Preparation

4.1.2.2.1 IOS Computer Software Packages

The following software packages are required to run the IOS Computer software:

- RedHat Linux 8.0
- OpenGL Performer for Linux 3.1.1
- HelMET Operational Software CSCI – Linux.

4.1.2.2.2 Storage Media

The IOS Computer software packages are provided on a CD-ROM disk.

4.1.2.2.3 Software Loading Instructions

Normally, the IOS Computer software packages are already installed in the system. Information on loading software on the IOS Computer is described in the HelMET Version Description Document [Reference l].

4.1.2.2.4 Software Initialisation Instructions

The following procedures are used to initialise the IOS Computer software:

- Assume that the Motion Platform Control Computer software and Simulation Computer software have been loaded.
- If the Launch_RTI icon has not been started, double-click the Launch_RTI icon on the IOS display monitor to start the HLA for the simulator.
- The IOS Computer software is started by double-clicking on the VR_Sim_IOS icon on the IOS display monitor located at the Instructor Operator Station.
- The IOS Federate Main Window is displayed on the IOS display monitor after a few seconds.

At this point, the IOS Computer software is operational.

4.1.2.3 Audio Subsystem Computer1 Software Preparation

4.1.2.3.1 Audio Subsystem Computer1 Software Packages

The following software packages are required to run the Audio Subsystem Computer1 software:

- Red Hat Linux Operating System 8.0
- HelMET Operational Software CSCI – LINUX.

4.1.2.3.2 Storage Media

The Audio Subsystem Computer1 software packages are provided on a CD-ROM disk.

4.1.2.3.3 Software Loading Instructions

Normally, the Audio Subsystem Computer1 software packages are already installed in the two computer systems. Information on loading software on the Audio Subsystem Computer1 is described in the HelMET Version Description Document [Reference l].

4.1.2.3.4 Software Initialisation Instructions

The following procedures are used to initialise the software for the Audio Subsystem Computer1:

- Assume that the Motion Platform Control Computer software, Simulation Computer software, and IOS Computer software have been loaded.
- The Audio Subsystem Computer1 has been logged in.

At this point, the Audio Subsystem Computer1 software is operational.

4.1.2.4 Audio Subsystem Computer2 Software Preparation

4.1.2.4.1 Audio Subsystem Computer2 Software Packages

The following software packages are required to run the Audio Subsystem Computer2 software:

- Red Hat Linux Operating System 8.0
- HelMET Operational Software CSCI – LINUX.

4.1.2.4.2 Storage Media

The Audio Subsystem Computer2 software packages are provided on a CD-ROM disk.

4.1.2.4.3 Software Loading Instructions

Normally, the Audio Subsystem Computer2 software packages are already installed in the two computer systems. Information on loading software on the Audio Subsystem Computer2 is described in the HelMET Version Description Document [Reference l].

4.1.2.4.4 Software Initialisation Instructions

The following procedures are used to initialise the software for the Audio Subsystem Computer2:

- Assume that the Motion Platform Control Computer software, Simulation Computer software, IOS Computer and Audio Subsystem Computer1 software have been loaded.
- The Audio Subsystem Computer2 has been logged in.

At this point, the Audio Subsystem Computer2 software is operational.

4.1.2.5 Motion Platform Control Computer Software Preparation

4.1.2.5.1 Motion Platform Control Computer Software Packages

The following software packages are required to run the Motion Platform Control Computer software:

- Microsoft MS-DOS Version 6.22
- An Ethernet packet driver for the specified Ethernet card
- FTP Software PC/TCP for DOS software
- Servos and Simulation Inc. 6-DOF software.

4.1.2.5.2 Storage Media

The Motion Platform Control Computer software packages are provided on 3.25-inch diskettes.

4.1.2.5.3 Motion Platform Control Computer Software Initialisation Instructions

The following procedures are used to initialise the Motion Platform Control Computer software:

- Turn on the Motion Platform Control Computer, including the display monitor.

CAUTION

After the computer starts its booting process, pressing any key will exit to a DOS command prompt. This is not the normal procedure.

- If no key is pressed, the Opening Display window is displayed.
- At this point, the Simulation Computer and Motion Platform Control Computer can exchange commands. The Running Display is displayed.
- From this point, status reports will be displayed in the status report box of the Running Display.

4.1.3 Other Pre-test Preparations

The pre-test preparations for the Daytime Freedeck Launch scenario are discussed in the following sections.

4.1.3.1 Daytime Freedeck Launch Scenario Pre-test Preparations

A pre-defined Daytime Freedeck Launch mission plan must be created prior to the execution of the Daytime Freedeck Launch scenario. The Daytime Freedeck Launch mission plan is defined with the data set described in Table 1.

Table 1 Daytime Freedeck Launch Pre-Defined Mission Plan Data Set

Data Item	Data	Unit
Local Time:	18:00	hours: minutes
Visibility	Unlimited	
Helo Position:	On Deck (in RSD)	
Deck Motion:	Custom Motion	
Lighting:	Day	
Altimeter:	29.0	in Hg
Air Temperature:	12	^{o}C
Ship Heading:	0.0	degrees
Ship Speed:	5	knots
Wind Heading:	303	degrees
Wind Speed:	17	Knots
Primary Wave Heading:	303	degrees
Primary Wave Height:	4	Feet
Primary Wave Period:	5	Seconds
Interference Wave Heading	0 (N/A)	Degrees
Interference Wave Height:	0 (N/A)	Feet
Interference Wave Period:	0 (N/A)	seconds

4.1.3.2 Simulator Equipment Pre-test Preparations

The following procedures are used by the Instructor to prepare the simulator hardware as described in Section 4.1.1 for simulation testing:

- Prepare the Simulation Computer Subsystem
- Prepare the Instructor Operator Station Subsystem
- Prepare the Audio Communication Subsystem
- Prepare the Sound and Vibration Subsystems
- Prepare the Video Distribution Subsystem
- Prepare the Visual Subsystem
- Prepare the Motion Platform Subsystem.

4.1.3.3 Pilot Pre-test Preparations

The following procedures are used by the Instructor to prepare the pilot for simulation testing:

- Set the collective pitch lever, cyclic pitch stick, and tail rotor pedals to the realistic start positions for the regime of flight being simulated (i.e. controls centered).
- Assist the pilot to be seated from the right-hand side of the motion platform.
- Explain the Momentarily Power Off button to the pilot (hold the pullback button below the collective pitch lever for three seconds).
- Assist the pilot strapping on the safety harness.
- Assist the pilot adjusting the seat to a comfortable position.
- Explain the HMD adjustment procedures to the pilot.
- Explain the HMD audio communication procedures to the pilot.

4.2 Night Time Freedeck Recovery Scenario

The Night Time Freedeck Recovery scenario exercises the capabilities of the simulator to land a Sea King helicopter in a virtual environment on the flight deck of a CPF at night time.

4.2.1 Hardware Preparation

The hardware preparation for the Night Time Freedeck Recovery scenario is identical to the Daytime Freedeck Launch scenario. See Section 4.1.1 for details.

4.2.2 Software Preparation

The software preparation for the Night Time Freedeck Recovery scenario is identical to the Daytime Freedeck Launch scenario. See Section 4.1.2 for details.

4.2.3 Other Pre-test Preparations

A pre-defined Night Time Freedeck Recovery mission plan must be created prior to the execution of the Night Time Freedeck Recovery scenario. The Night Time Freedeck Recovery mission plan is defined with the data described in Table 2.

Table 2 Night Time Freedeck Recovery Pre-Defined Mission Plan Data Set

Data Item	Data	Unit
Local Time:	20:00	hours: minutes
Visibility	Unlimited	
Helo Position:	Delta Hover	
Deck Motion:	Custom Motion	
Lighting:	Full Moon	
Altimeter:	29.0	in Hg
Air Temperature:	12	^{o}C
Ship Heading:	0.0	degrees
Ship Speed:	5	knots

Wind Heading:	303	degrees
Wind Speed:	17	Knots
Primary Wave Heading:	303	degrees
Primary Wave Height:	5.0	Feet
Primary Wave Period:	5.0	Seconds
Interference Wave Heading	0 (N/A)	Degrees
Interference Wave Height:	0 (N/A)	Feet
Interference Wave Period:	0 (N/A)	seconds

4.2.3.1 Simulator Equipment Pre-test Preparations

The simulator equipment preparation for the Night Time Freedeck Recovery scenario is identical to the Daytime Freedeck Launch scenario. See Section 4.1.3.2 for details.

4.2.3.2 Pilot Pre-test Preparations

The pilot preparation for the Night Time Freedeck Recovery scenario is identical to the Daytime Freedeck Launch scenario. See Section 4.1.3.3 for details.

4.3 Daytime Hauldown Recovery Scenario

The Daytime Hauldown Recovery scenario exercises the capabilities of the simulator to land a Sea King helicopter on the flight deck of a CPF using the messenger cable and the hauldown cable during daytime in a virtual environment.

4.3.1 Hardware Preparation

The hardware preparation for the Daytime Hauldown Recovery scenario is identical to the Daytime Freedeck Launch Scenario. See Section 4.1.1 for details.

4.3.2 Software Preparation

The software preparation for the Daytime Hauldown Recovery scenario is identical to the Daytime Freedeck Launch scenario. See Section 4.1.2 for details.

4.3.3 Other Pre-test Preparations

A pre-defined Daytime Hauldown Recovery mission plan must be created and stored in the Simulation Computer Subsystem prior to the execution of the Daytime Hauldown Recovery scenario. The Daytime Hauldown Recovery mission plan is defined with the data described in Table 3.

Table 3 Daytime Hauldown Recovery Pre-Defined Mission Plan Data Set

Data Item	Data	Unit
Local Time:	14:10	hours: minutes
Visibility	Unlimited	
Helo Position:	Delta Hover	
Deck Motion:	Custom Motion	
Lighting:	Day	
Altimeter:	29.0	in Hg
Air Temperature:	11	^{o}C
Ship Heading:	285	degrees

Ship Speed:	10	knots
Wind Heading:	270	degrees
Wind Speed:	30	Knots
Primary Wave Heading:	270	degrees
Primary Wave Height:	5.0	Feet
Primary Wave Period:	5.0	Seconds
Interference Wave Heading	0 (N/A)	Degrees
Interference Wave Height:	0 (N/A)	Feet
Interference Wave Period:	0 (N/A)	seconds

4.3.3.1 Simulator Equipment Pre-test Preparations

The Simulator equipment preparation for the Daytime Hauldown Recovery scenario is identical to the Daytime Freedeck Launch scenario. See Section 4.1.3.2 for details.

4.3.3.2 Pilot Pre-test Preparations

The pilot preparation for the Daytime Hauldown Recovery scenario is identical to the Daytime Freedeck Launch scenario. See Section 4.1.3.3 for details.

5 Test Descriptions

5.1 Freedeck Launch Scenario Test

The Freedeck Launch scenario test, which is based on the Launch Operational Sequence diagram, consists of a single test case.

5.1.1 Daytime Freedeck Launch Test Case

5.1.1.1 Description

The current meteorological report indicates no overcast with unlimited visibility. Barometric pressure is 30 inches Mercury (i.e., 30.00 millibars or 760 mm Hg). True wind is from 303 degrees at 17 knots. There are no wind gusts. The outside air temperature is 12 degrees Celsius.

A Canadian Patrol Frigate (CPF) is steaming on a course of 0 degrees at 5 knots on a clear day with sea state 5 conditions. The ship is pitching 3 degrees and rolling 10 degrees. The sea temperature is 9 degrees Celsius.

The helicopter is to be launched during daylight at 18:00 hours local time to conduct an anti-submarine warfare (ASW) mission. If it is not the first launch of the day, it is assumed that Flying Stations were sounded 10 minutes before the recovery of the helicop¬ter currently preparing for departure. The helicopter is located on the flight deck and the rapid securing device (RSD) is closed.

All personnel are closed up at Flying Stations. The 2-minute ready-to-launch warning at approximately 17:50 hours local time has been given. Consequential activities of disconnecting the communication cable, setting the deck status lights (DSL) to amber, and communicating flying data have been performed. The deck status lights are also known as trafficator lights.

The Officer-of-the-Watch (OOW) passes flying courses, relative wind, and altimeter setting. After launch information is exchanged and clearance to launch is received, the tail probe is raised in preparation for launch. Airspace abaft the beam is checked and the RSD is opened during a steady period in deck motion. Clearance for take-off is given and the helicopter takes off.

5.1.1.2 Implemented Daytime Launch Scenario

The implemented scenario is as follows:

- The Landing Signals Officer (LSO) requests launch by setting the activate launch light to amber and possibly mak¬ing a verbal request to the OOW.
- After launch information is exchanged (including updates to flying course, true wind, relative wind, and altimeter) and clearance to launch is received, the tail probe is raised in preparation for launch.
- Airspace abaft the beam (anywhere in a direction perpendicular to the ship gunwale) is checked. The DSL is set to green and the RSD is opened during a steady period in deck motion.
- Clearance for take-off is given and the helicopter takes off.
- The DSL is reset to amber.

5.1.1.3 Daytime Launch Scenario Prerequisite Conditions

The prerequisite conditions for the Daytime Launch scenario are as follows:

- Sounding of flight stations 30 minutes before flight time at 18:00 hours local time. If this is not the first flight, then stations are sounded 10 minutes before recovery in preparation for the next flight. Deck side nets are lowered.
- For the first flight of the day, the next six steps are applicable.
- Traversal of helicopter to launch position while LSO and Bridge perform sys¬tem checks.
- The RSD safety bar is removed.
- Helicopter engine number 1 is started.
- Once hydraulic systems have been activated, the blades and tail pylon are spread.
- Helicopter aircraft checks are performed.
- Helicopter engine number 2 is started.
- The ship manoeuvres to final launch orientation.
- The 2-minute ready-to-launch warning is given at 17:58 hours local.
- For the first launch of the day, the communication cord linking the helicopter's internal communication system (ICS) to the ship's internal communication system (i.e., SHINCOM cable connection) is unplugged.
- Quickly thereafter, the DSL is set to amber.

- Simultaneously, data (including flying course, true wind, relative wind, and altimeter) are passed to the LSO.
- Quickly thereafter, the same data is relayed from the LSO to the helicopter.

5.1.1.4 Test Procedures

The test procedures for the Daytime Launch scenario test case are described in Table 4.

Table 4 Test Procedures for Daytime Freedeck Launch Scenario Test Case

No.	Steps	Response	Verification
1	The Instructor ensures that all the simulator subsystems are working properly.		
2	The Instructor checks that the pilot has completed the pre-test steps including emergency power-off procedures and is sitting in the pilot's seat with the safety harness strapped on.		
3	At the IOS display monitor, double-click on the "HelMET" icon to display the HelMET Training Window. Select "Manual Flight Mode (Cockpit)"		
4	At the IOS display monitor, Select "Pilot and IOS"	The "HelMET IOS" window is displayed on the IOS display monitor. An example of the "HelMET IOS" window is shown in Figure 2 HelMET IOS Main Window. The "HelMET Pilot Control" window is displayed on	Verify that the "HelMET IOS" window is displayed: Pass/Fail. Verify that the "HelMET Pilot Control"

No.	Steps	Response	Verification
		the IOS display monitor. An example of the “HelMET Pilot Control” window is shown in Figure 5.	window is displayed: Pass/Fail Verify that the red Platform, Tracker, Cereal Box, Sound and Conferencing indicators are displayed: Pass/Fail
5	On the “HelMET IOS” window, click on the “Initiate Session” icon.	The “Select a Mission Plan” window is displayed on top of the “HelMET IOS” window. An example of the “Select a Mission Plan” window is shown in Figure 3.	Verify that the “Select a Mission Plan” window is displayed: Pass/Fail
6	On the “Select a Mission Plan” window, select the “Launch.mpn” mission plan for the predefined Daytime Launch scenario.	The mission plan filename “Launch.mpn” is appended to the complete file path where the predefined Daytime Launch mission plan will be loaded.	Verify that the mission plan filename “Launch.mpn” is displayed: Pass/Fail
7	On the “Select a Mission Plan” window, click on the OK button.	*The “Select a Mission Plan” window is closed and a “System Busy” window is displayed. An example of the “System Busy” window is shown in Figure 3 Select a Mission Plan Window* .	Verify that the “System Busy” window is displayed: Pass/Fail
8		After a few minutes, the “System Busy” window is closed.	

No.	Steps	Response	Verification
9		At the bottom of the “HelMET IOS” window, the “Initiate Session”, “Join Session”, “Debrief Missions” and “Exit” icons are replaced by “Select Roles”, “Start Session” and “End Session” icons	Verify that the “Select Roles”, “Start Mission” and “End Session” icons are displayed: Pass/Fail
10	At the “HelMET IOS” window, verify that the information for the specified mission plan is correct: Mission Plan: Name: Launch Type: Deck Landing Procedures Details: Local Time: 18:00 Visibility: Unlimited Helo Position: On Deck Deck Motion: Custom Motion Lighting: Day Altimeter (in hg): 29.00 Air Temperature (ºC): 12 Ship: Heading: 0 deg		Verify that the specified mission plan contents are correct: Pass/Fail

No.	Steps	Response	Verification
	Speed: 5.0 kts Wind: Heading: 303 deg Speed: 17 kts Primary Wave: Heading: 303 deg Height: 4.0 ft Period: 5.0 s		
11	On the HelMET Pilot Control" window, select the Video from the Settings pull-down menu.	The "Video Settings" window is displayed on the IOS display monitor. An example of the "Video Settings" window is shown in Figure 17.	Verify that the "Video Settings" window is displayed: Pass/Fail
12	On the "Video Settings" window, click on the "VR Goggle" button and then click on the "Close" button.		
13	At the SX-80 Front Control Box, turn on the power supply to the SX-80 HMD by activating the power on/off button.		
14	On the HelMET Pilot Control" window, click on the "Join Session"	Two successive "System Busy" windows are displayed for a few minutes. An example of the "System Busy" window is shown in	Verify that the two "System Busy" windows are displayed:

No.	Steps	Response	Verification
	icon.	Figure 6.	Pass/Fail.
15	On the HelMET IOS" window, click on the "Start Session" icon.	At the "Participants" window, an "Initializing Mission" status message appears next to the IOS. An example of the "Init Mission" window is shown in Figure 7.	Verify that the "Initializing Mission" status message is displayed: Pass/Fail
16		The "System Busy" window is displayed for a few minutes.	Verify that the "System Busy" window is displayed: Pass/Fail.
17	After the "System Busy" window is closed, check the device indicators for changes at the HelMET Pilot Control" window.		Verify that the green Tracker, Cereal Box, Sound and Conference indicators are displayed: Pass/Fail. Verify that the red Platform indicator is displayed: Pass/Fail Verify with Pilot that the left and right eye views are displayed in the Nvision SX60 HMD: Pass/Fail
18	The Instructor requests the Pilot to put on the HMD with the headset and microphone.		

No.	Steps	Response	Verification
19	The Instructor puts on the headset and microphone.		
20	The Instructor verifies the operation of the headset and microphone with the Pilot.		
21	On the HelMET Pilot Control" window, click on the "Fwd/Aft", "Up/Down", "Heading" and "Left/Right" buttons to adjust the Pilot eyepoint control for viewing.	The pilot's view displayed on the repeater display monitor should have moved accordingly.	Verify that the pilot's view has moved accordingly on the repeater display monitor: Pass/Fail
22	Release the Stop button located at the Instructor Operator Station.	The electrical power is applied to the Motion Platform Subsystem EMS motor drives.	Verify that the green L2-MOTION POWER ON Light indicator, located on the Electrical Power Control Panel, is illuminated: Pass/Fail
23	On the "HelMET Pilot Control" window, click on the Platform Control "Start" button to enable power to the Motion Platform Subsystem	The "Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!" dialog window is displayed.	Verify that the "Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!" dialog window is displayed: Pass/Fail
24	On the "Is the Motion Platform power on with	After the "Is the Motion Platform power on with an amber and a red	After a few seconds, verify that

No.	Steps	Response	Verification
	an amber and a red light? Not following the correct procedure could cause the platform to behave violently!" dialog window, click on the "Yes" button.	light? Not following the correct procedure could cause the platform to behave violently!" dialog window is closed,closed; the green Platform indicator is displayed at the HelMET Pilot Control" window	the green Platform indicator is displayed: Pass/Fail
25	On the HelMET Pilot Control" window, click on the "Ready" button.	A "Pilot Reminder" window is displayed. An example of the "Pilot Reminder" window is shown in Figure 9.	Verify that the "Pilot Reminder" window is displayed: Pass/Fail
26	On the "Pilot Reminder" window, click on the "Yes" button.	The "Pilot Reminder" window is closed.	Verify that the "Pilot Reminder" window is closed: Pass/Fail
27		At the HelMET Pilot Control" window, the Participant status message (Pilot Control Ready for Mission) is displayed.	Verify that the Participant status message (Pilot Control Ready For Mission) is displayed: Pass/Fail
28		At the HelMET IOS" window, the Participant status message (Pilot Control Ready for Mission) is displayed.	Verify that the Participant status message (Pilot Control Ready For Mission) is displayed: Pass/Fail
29	On the HelMET IOS" window, click on the "Ready" button	The green Ready button indicator is displayed and the "Start Mission" button is available.	Verify that the green Ready button indicator is displayed: Pass/Fail
30		At the "Ship Control" window, no trafficator light button is selected.	Verify that no trafficator light button is selected: Pass/Fail

No.	Steps	Response	Verification
31		At the “Cable Tension Control” window, the Cable Tension value of 0 lbs is displayed	Verify that the Cable Tension value of 0 lbs is displayed: Pass/Fail
32		At the “Trafficator Lights” window, the Red, Green and Off trafficator lights are not selected.	Verify that the Red, Green and Off Trafficator lights are not selected: Pass/Fail
33		At the “Trafficator Lights” window, the amber trafficator light is displayed.	Verify that the amber trafficator light is displayed: Pass/Fail
34		At the “Hauldown Control” window, the amber Tail Probe Down indicator is displayed	Verify that the amber Tail Probe Down indicator is displayed: Pass/Fail
35		At the “Hauldown Control” window, the green Main Probe Down indicator is displayed	Verify that the green Main Probe Down indicator is displayed: Pass/Fail
36		At the “Hauldown Control” window, the green Messenger Separated indicator is selected	Verify that the green Messenger Separated indicator is displayed: Pass/Fail
37		At the “Hauldown Control” window, the Landing Gear Down icon is displayed	At the “Hauldown Control” window, the Landing Gear Down icon is displayed
38		At the “Trap Control” window, the RSD trap is closed	Verify that the RSD trap is closed:

No.	Steps	Response	Verification
			Pass/Fail
39		At the “Trap Control” window, the green Helo Trapped indicator is displayed	Verify that the green Helo Trapped indicator is displayed: Pass/Fail
40		At the “Helo Status” window, the Winch indicator is displayed with the OFF value	Verify that the Winch indicator is displayed with the OFF value: Pass/Fail
41		At the “Helo Status” window, the green Main Probe Down indicator is displayed	Verify that the green Main Probe Down indicator is displayed: Pass/Fail
42		At the “Helo Status” window, the green Trapped indicator is displayed	Verify that the green Trapped indicator is displayed: Pass/Fail
43		At the “Helo Status” window, the green Tail Probe Down indicator is displayed.	Verify that the green Tail Probe Down indicator is displayed: Pass/Fail
44		At the “Ship Status” window, check the ship heading and speed, true wind direction and speed, relative wind direction and speed, and altimeter for correctness	Verify that the ship heading and speed, true wind heading and speed, relative wind and speed, and altimeter are correct: Pass/Fail
45		At the “Situation Awareness” window, the RSD trap is closed and the red flag is in the up position.	Verify that the RSD red flag is in the up position: Pass/Fail

No.	Steps	Response	Verification
46		At the “Situation Awareness” window, the green YES and amber LNCH buttons are displayed.	Verify that the green YES and amber LNCH buttons are displayed: Pass/Fail
47		At the “Situation Awareness” window, the amber trafficator light is displayed	Verify that the amber trafficator light is displayed: Pass/Fail
48		At the “Situation Awareness” window, the Cable Tension value of 0 lbs is displayed.	Verify that the Cable Tension value of 0 lbs is displayed: Pass/Fail
49	On the HelMET IOS” window, click on the “Start Mission” button	The green mission status indicator is displayed to indicate that the mission has started. An example of the HelMET IOS running window is shown in Figure 10.	Verify that the green Mission status indicator is displayed: Pass/Fail
50	The Pilot calls: “Ready takeoff, ASE tail probe, # (single engine speed)”.		
51	The Instructor calls: “Roger”.		
52	The Instructor confirms that it is ready for launch.		
53	The Instructor ensures that the airspace forward of the beam is clear.		

No.	Steps	Response	Verification
54	The Instructor ensures that 'YES' is for launch request		
55	The Instructor calls: "(flying course), (true wind), (relative wind), and (altimeter setting)".		
56	The Pilot calls: "Roger"		
57	The Instructor ensures that the port side flight deck and air space are clear and that the safety bar is removed		
58	The Instructor ensures that the main probe tip will clear the RSD.		
59	The Instructor calls: "Up tail probe".		
60	On the "Hauldown Control" window, click on the Tail Probe Up button.	At the "Helo Status" window, the amber Tail Probe Down indicator is off and the green Tail Probe Up indicator is displayed.	Verify that the amber Tail Probe Down indicator is off and the green Tail Probe Up indicator is displayed: Pass/Fail
61	The Instructor calls: "Tail probe is up".		
62	The Instructor checks that the port side airspace abaft the beam is clear and that the port side of flight deck is clear.		

No.	Steps	Response	Verification
63	The Instructor ensures that the starboard airspace abaft the beam is clear		
64	The Instructor evaluates the flight deck motion for steady period		
65	If the flight deck is not steady, the Instructor calls: “Standby, awaiting the deck”.		
66	On the “Trap Control” window, click on the RSD trap.	At the “Situation Awareness” window, check the RSD red flag is in the down position	Verify that the RSD red flag is in the down position: Pass/Fail
67	The Instructor checks that the port arrester beam is opened		
68	The Instructor checks that the arrester beam is opened.		
69	The Instructor ensures that the main probe tip will clear the RSD.		
70	On the “Trafficator Lights” window, click on the green trafficator light button.	At the “Situation Awareness” window, the green trafficator light is displayed	Verify that the green trafficator light is displayed: Pass/Fail
71	The Instructor calls: “Clear take off”.		

No.	Steps	Response	Verification
72	The Pilot controls the helicopter to take-off.		
73	The Instructor observes that the helicopter has taken off.		The Instructor observes that the helicopter has taken off.
74	The Pilot controls the helicopter to maintain it in a hover position.		
75	If the helicopter has departed, skip the next six steps. If the helicopter has not taken off, select the amber trafficator light.	At the “Situation Awareness” window, the amber trafficator light is displayed	Verify that the amber trafficator light is displayed: Pass/Fail
76	If the helicopter has not taken off, the Instructor reports status. The helicopter is trapped and the trapped status is reported.		
77	The Instructor calls: “All clear”.		
78	The Instructor (NFC) checks the flight instruments for aircraft positioning.		
79	The Instructor (NFC) calls: “Clear Left” or “Clear Right”		
80	The Pilot departs from the hover position.		

No.	Steps	Response	Verification
81	The Instructor (FLYCO) observes that the helicopter has departed.		Verify that the helicopter has departed: Pass/Fail
82	The Instructor calls: “Bridge SAC LSO Helo is departing port side”. “Break break”. “SAC LSO When you have coms you have control”.		
83	On the HelMET IOS” window, click on the “Pause” button.	The yellow HelMET IOS Status and Pause button indicator are displayed. An example of the HelMET IOS” Pause window is shown in Figure 11	Verify that the yellow HelMET IOS indicator is displayed: Pass/Fail
84	On the HelMET IOS” window, click on the “Stop” button.	A HelMET IOS” window with the Close button is displayed	Verify that the Close button is displayed: Pass/Fail
85	On the HelMET Pilot Control” window, click on the Platform Control “Stop” button to remove power to the Motion Platform Subsystem EMS motors.	The “System Busy” window is displayed for a few minutes.	
86	Press the Stop button located at the Instructor Operator Station.		Verify that the green L2-MOTION POWER ON Light indicator, located on the Electrical Power Control Panel is not illuminated: Pass/Fail

No.	Steps	Response	Verification
87	At the SX60 Front Control Box, turn off the power supply by depressing the power on/off button.		
88	On the HelMET Pilot Control" window, select the Video Settings from the Settings pull-down menu.	The "Video Settings" window is displayed on the IOS display monitor	Verify that the "Video Settings" window is displayed: Pass/Fail
89	On the "Video Settings" window, click on the "Monitor" button.	The "If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?" dialog window is displayed on the IOS display monitor.	Verify that the "If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?" dialog window is displayed on the IOS display monitor: Pass/Fail
90	On the "If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?" dialog window and click the "Yes" button.	The "If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?" dialog window is closed.	
91	On the "Video Settings" window, click on the "Close" button.	The "Video Settings" window is closed.	Verify that the "Video Settings" window is closed: Pass/Fail
92	On the HelMET IOS"	The "Save missions for later	Verify that the

No.	Steps	Response	Verification
	window, click on the “Close” button.	review?” dialog window is displayed. An example of the “Save missions for later review?” dialog window is shown in Figure 13.	“Save missions for later review?” dialog window is displayed: Pass/Fail
93	On the “Save missions for later review?” dialog window, click on the “Yes” button	The “Save missions for later review?” dialog window is closed.	Verify that the “Save missions for later review?” dialog window is closed: Pass/Fail
94		The “Enter the name of the file to save the mission” window is displayed. An example of the “Enter the name of the file to save the mission” window is shown in Figure 14.	Verify that the “Enter the name of the file to save the mission” window is displayed: Pass/Fail
95	On the “Enter the name of the file to save the mission” window, enter a filename with extension (e.g. launch_1.log) and click on the “OK” button	The “Enter the name of the file to save the mission” window is closed and the HelMET IOS” window with an “End Session” icon is displayed. An example of the HelMET IOS” window is shown in Figure 12.	Verify that the “Enter the name of the file to save the mission” window is closed and the HelMET IOS” window with an “End Session” icon is displayed: Pass/Fail
96	On the HelMET IOS” window, click on the “End Session” icon	The “The master has closed the session” window is displayed. An example of the “The master has closed the session” window is shown in *Figure 15*.	Verify that the “The master has closed the session” window is displayed: Pass/Fail
97	On the “The master has closed the session” window, click on the “OK” button.	The “The master has closed the session” window is closed.	Verify that the “The master has closed the session” window is closed: Pass/Fail

No.	Steps	Response	Verification
98	On the HelMET IOS" window, click on the "Review Missions" icon.	The HelMET IOS" window with a list of filenames is displayed	Verify that the HelMET IOS" window with a list of filenames is displayed: Pass/Fail
99	On the HelMET IOS" window, select the previously entered filename (e.g. launch_1.log) and click on the "OK" button.		
100	On the HelMET IOS" window, select the LSO Model: EyePoint from the Available Viewpoints.	The LSO Model viewpoint is displayed on the HelMET IOS" window. An example of the HelMET IOS" window is shown in Figure 16.	Verify that the LSO Model view point is displayed on the HelMET IOS" window: Pass/Fail
101	On the HelMET IOS" window, select the double right arrow button to replay at a fast forward speed.	The LSO Model viewpoint is redisplayed at a fast forward speed.	Verify that the LSO Model view point is redisplayed at a fast forward speed: Pass/Fail
102	On the HelMET IOS" window, click on the "Close" button.		
103	On the HelMET IOS" window, click on the "Exit" icon.	The HelMET IOS" window is closed	Verify that the HelMET IOS" window is closed: Pass/Fail
104	On the HelMET Pilot Control" window, click on the "Exit" icon.	The HelMET Pilot Control" window is closed	Verify that the HelMET Pilot Control" window is closed: Pass/Fail

No.	Steps	Response	Verification
105	The Instructor removes the headset and microphone.		
106	The Instructor requests the Pilot to close his eyes for a few seconds.		
107	After a few seconds, the Instructor requests the Pilot to remove the HMD		
108	The Instructor places the HMD in a holder at the back of the pilot’s seat.		
109	The Instructor helps the Pilot to remove the safety harness.		
110	The Instructor helps the Pilot step down from the Motion Platform.		

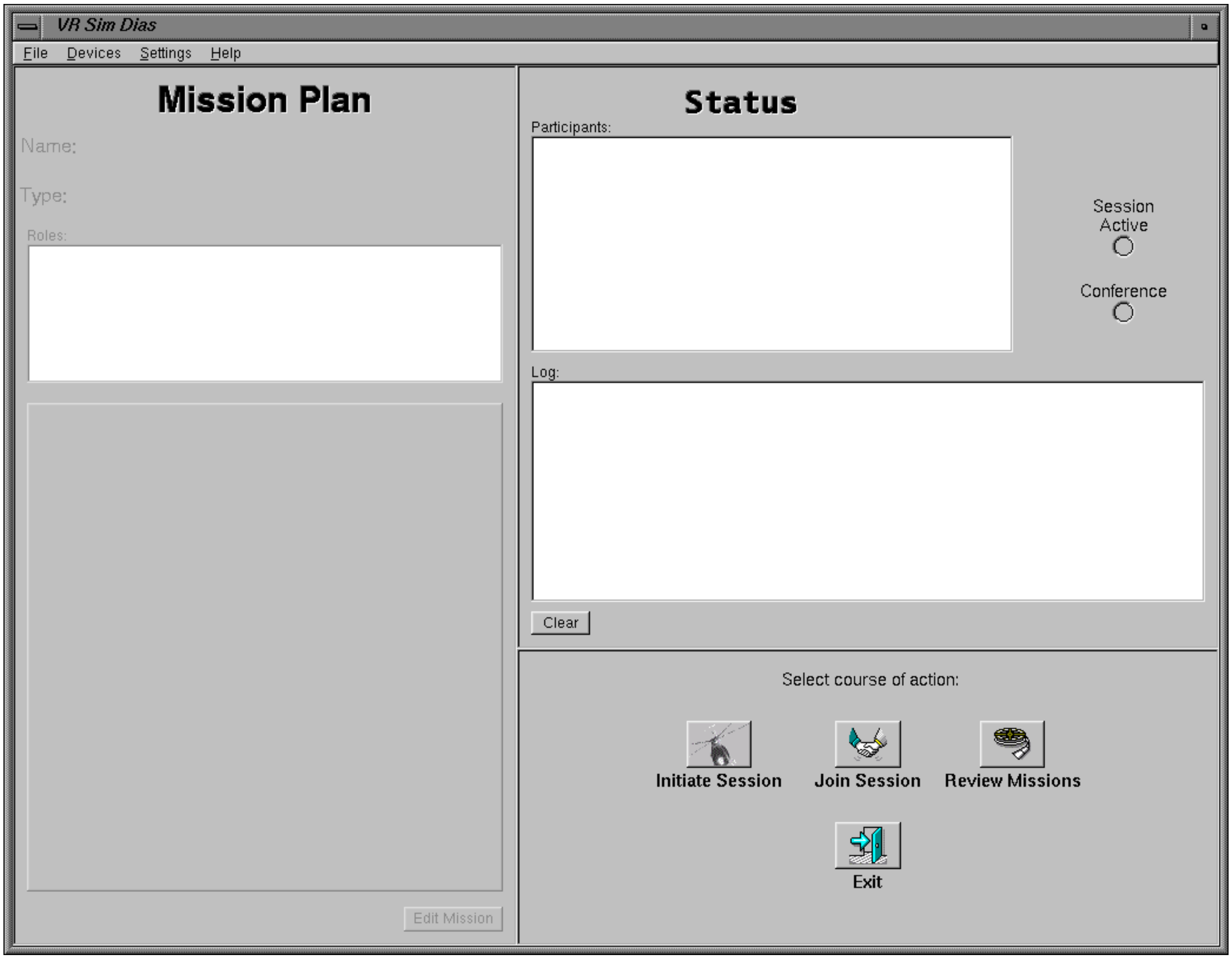

Figure 2 HelMET IOS Main Window

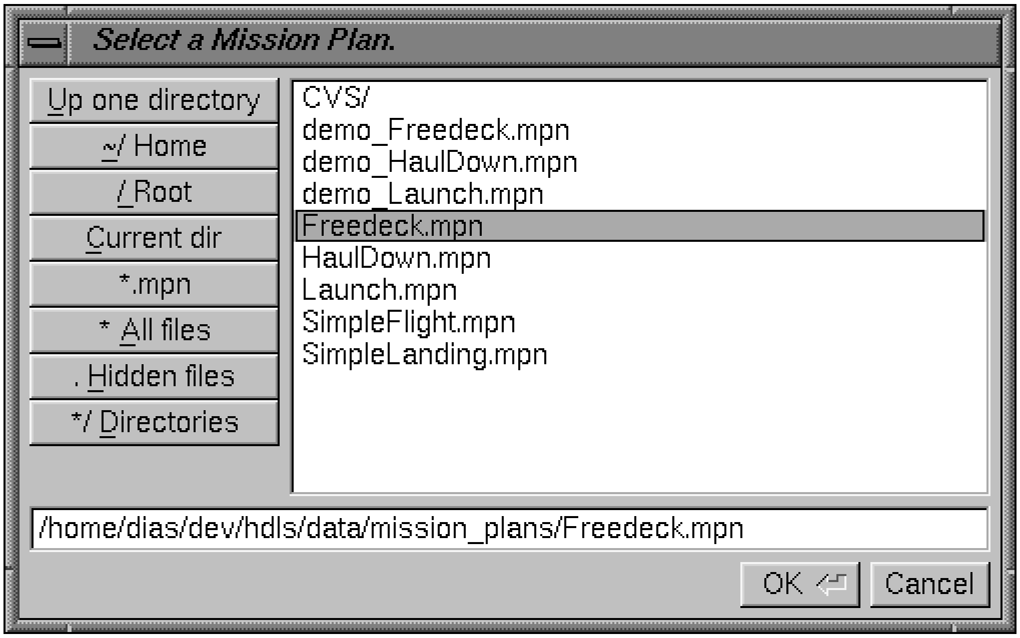

Figure 3 Select a Mission Plan Window

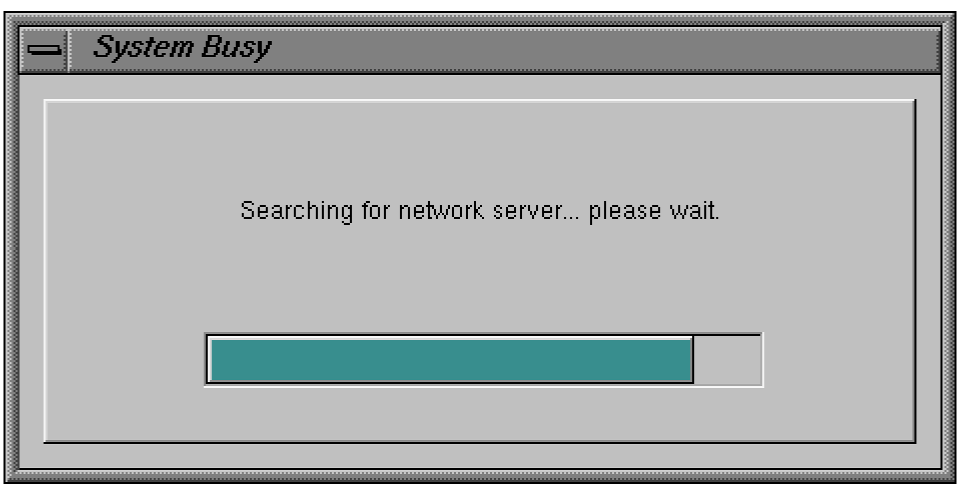

Figure 4 HelMET IOS System Busy Window

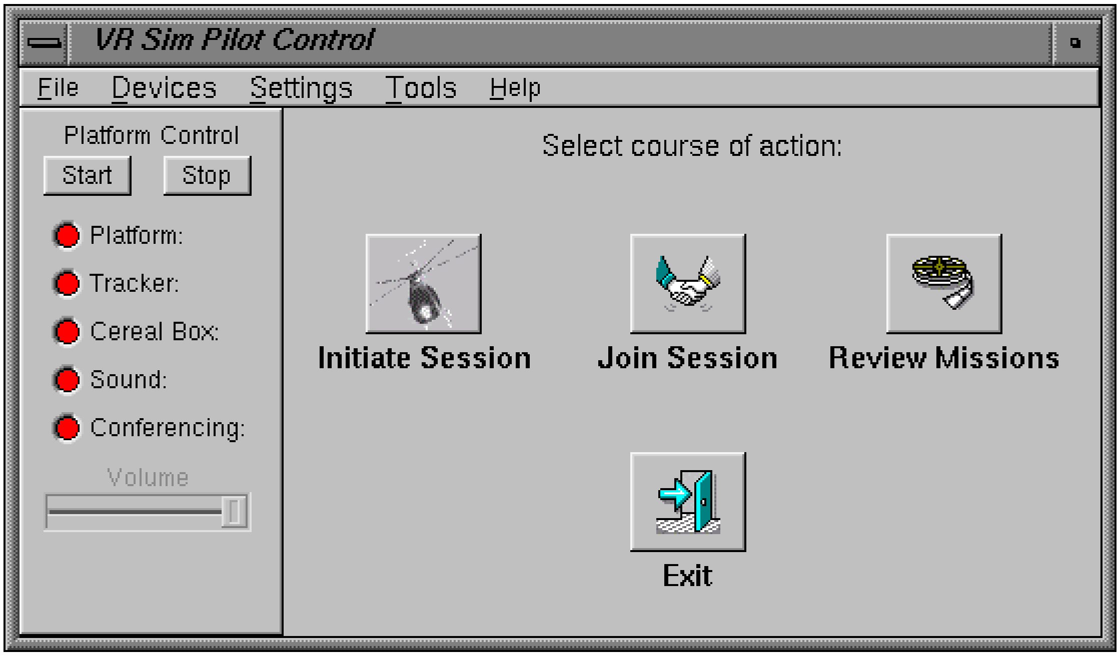

Figure 5 HelMET Pilot Control Main Window

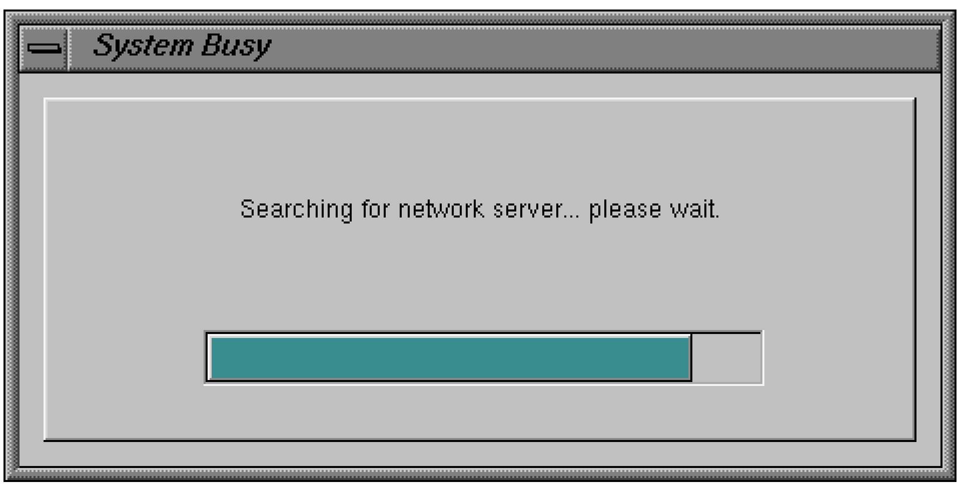

Figure 6 HelMET Helo First System Busy Window

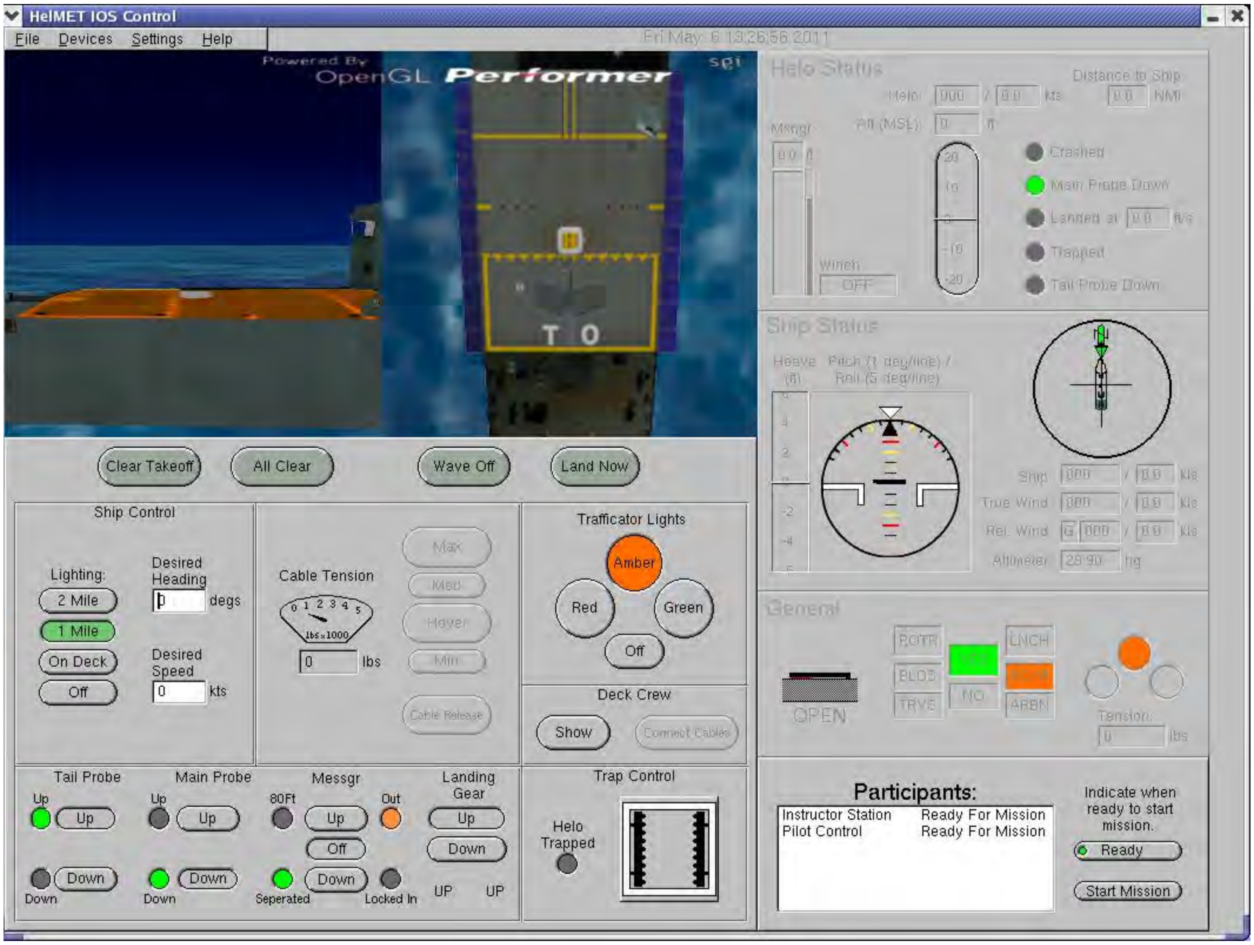

Figure 7 HelMET IOS – Mission Ready Window

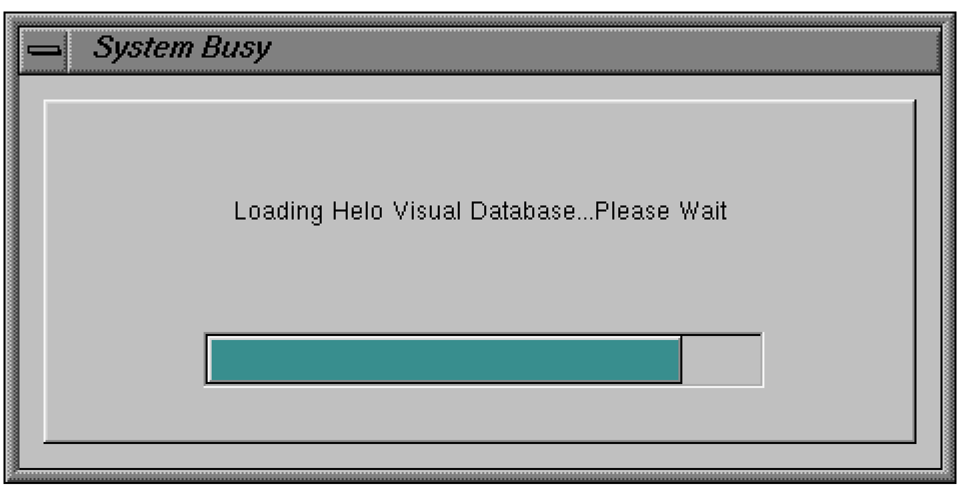

Figure 8 HelMET Helo Second System Busy Window

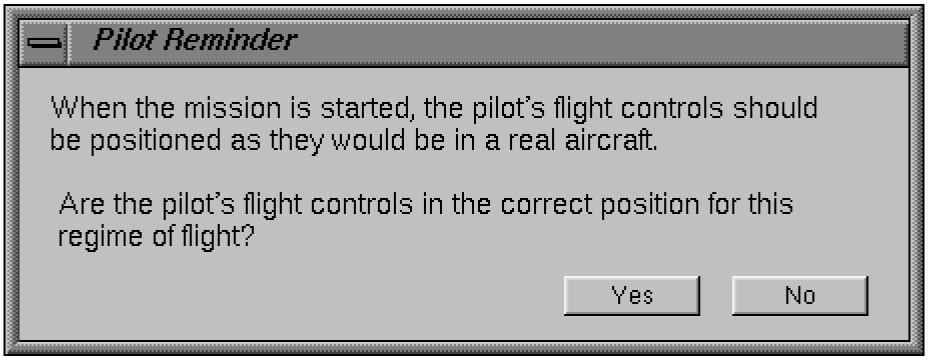

Figure 9 HelMET Helo Pilot Reminder Window

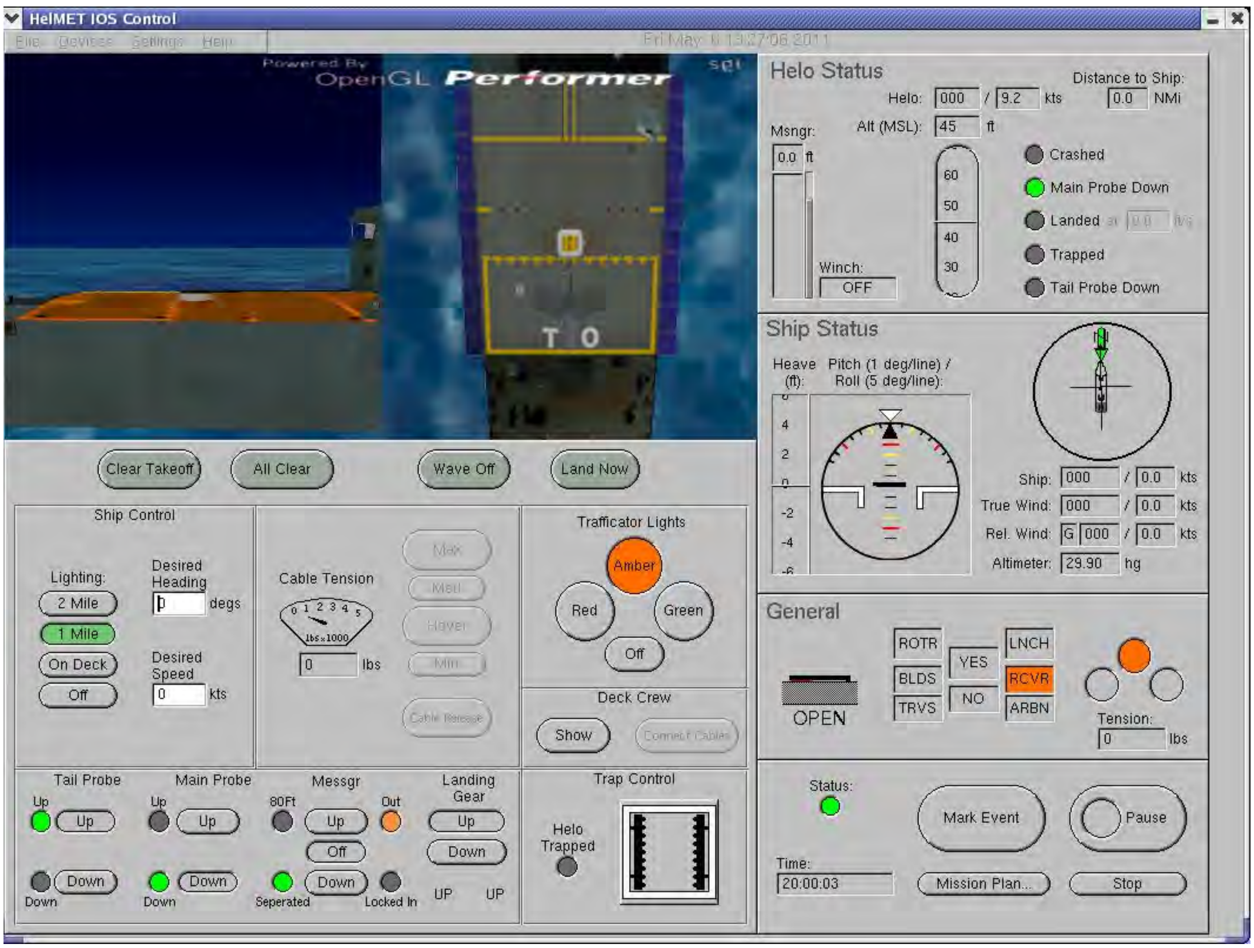

Figure 10 HelMET IOS Running Window

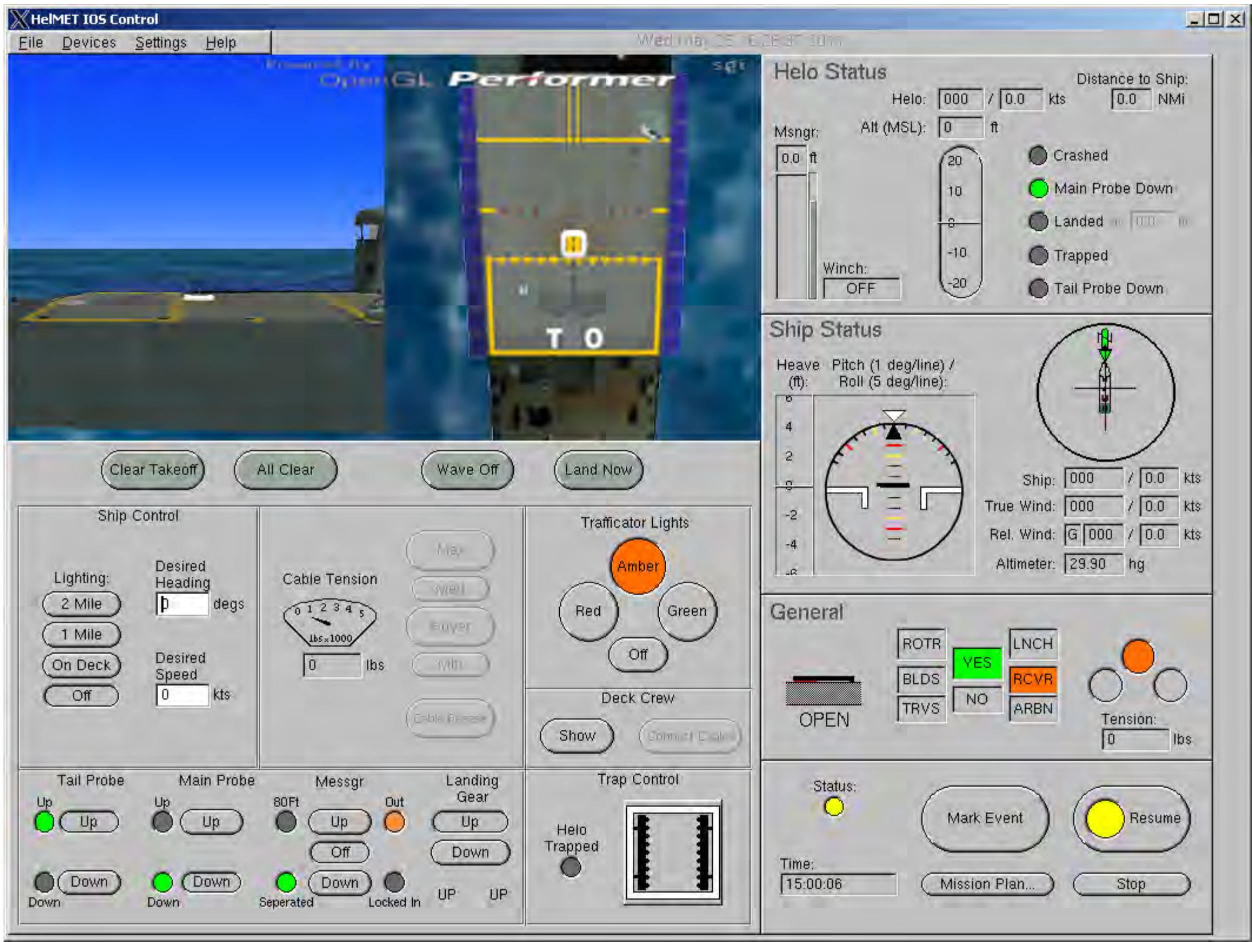

Figure 11 HelMET IOS Pause Window

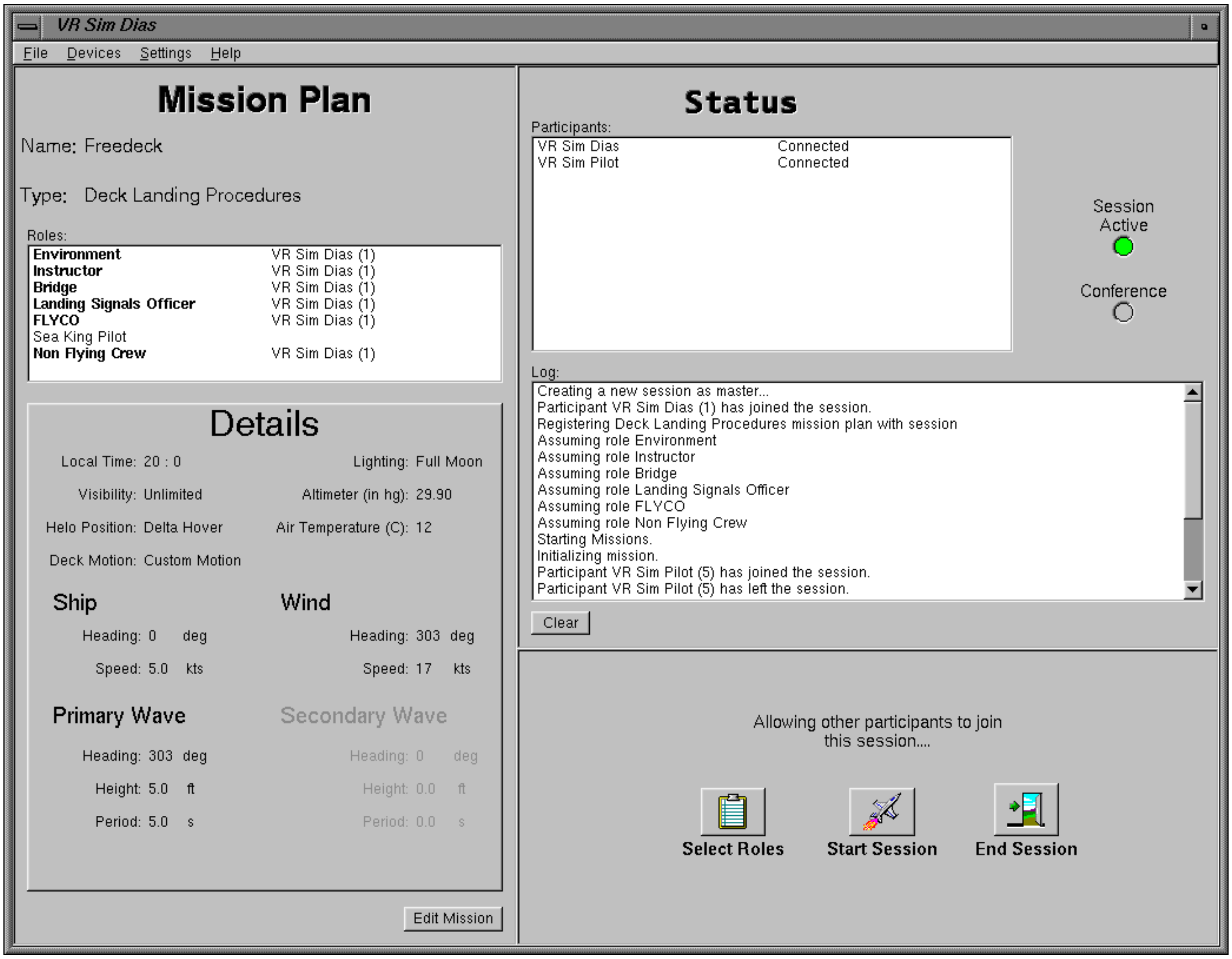

Figure 12 HelMET IOS End Session Window

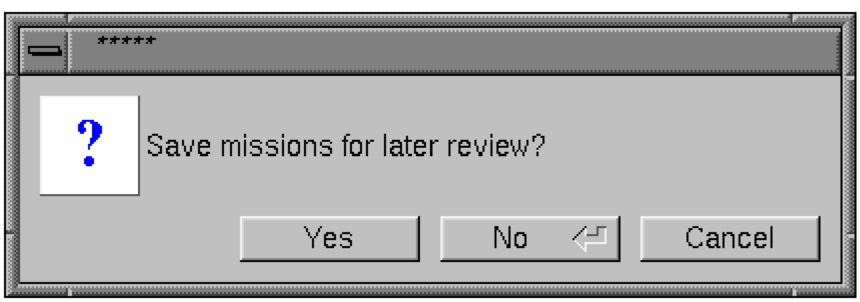

Figure 13 HelMET IOS Save Mission Window

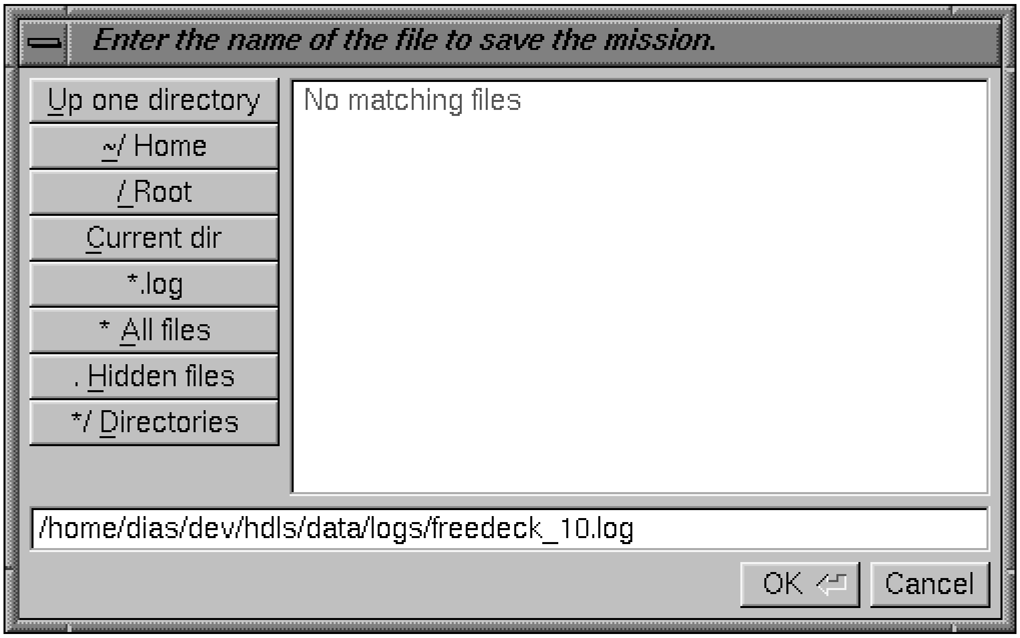

Figure 14 HelMET IOS Enter Log File Name Window

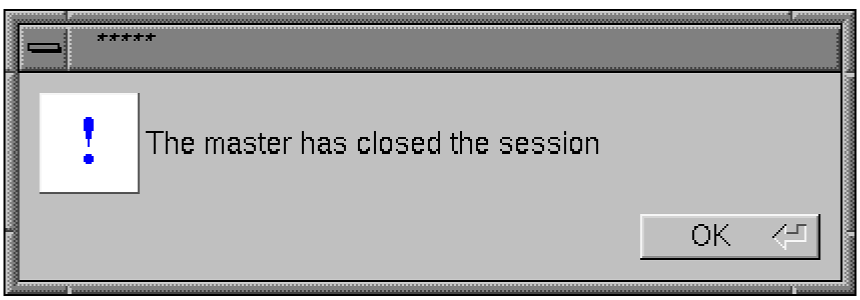

Figure 15 HelMET IOS Master Closed Session Window

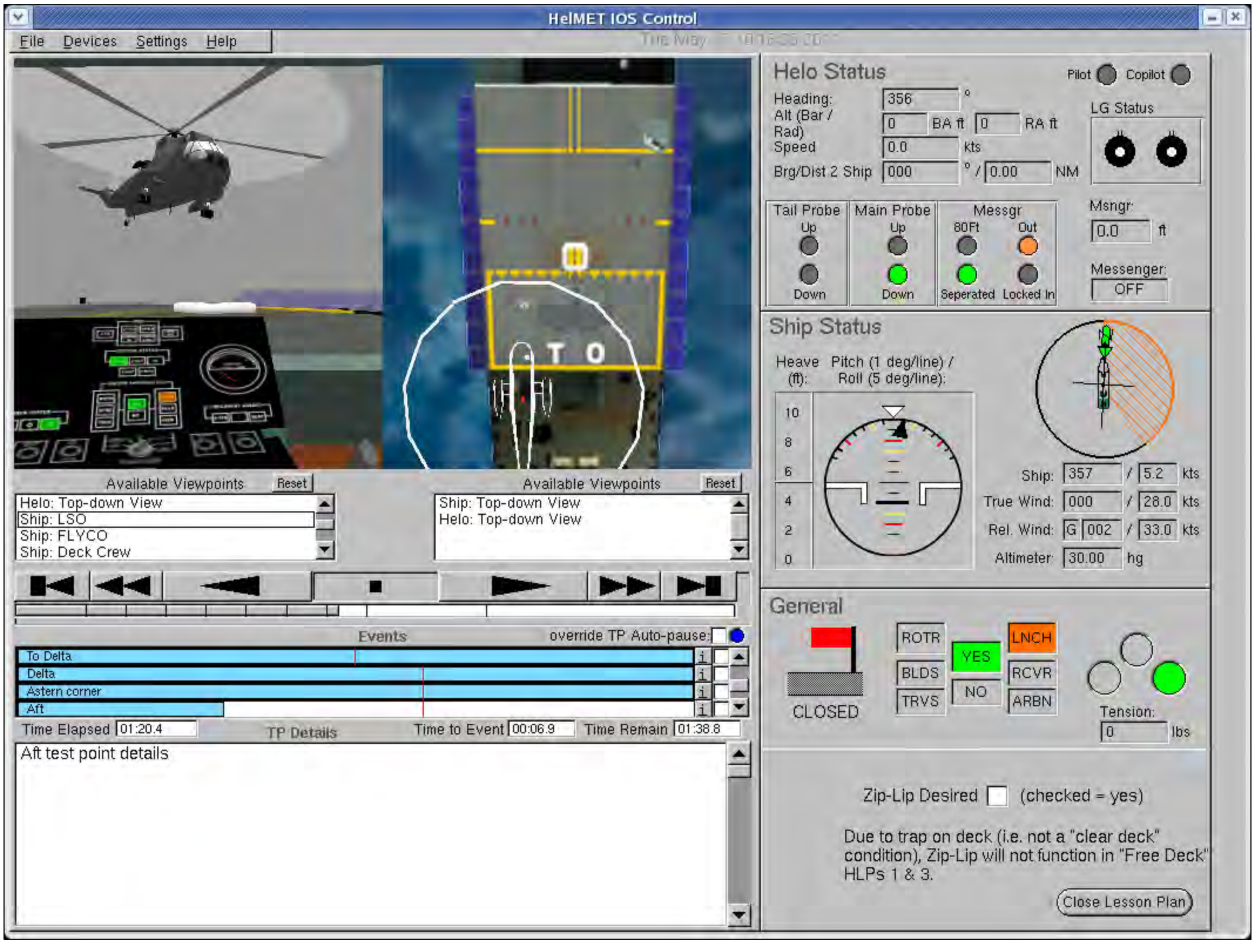

Figure 16 HelMET IOS Replay Window

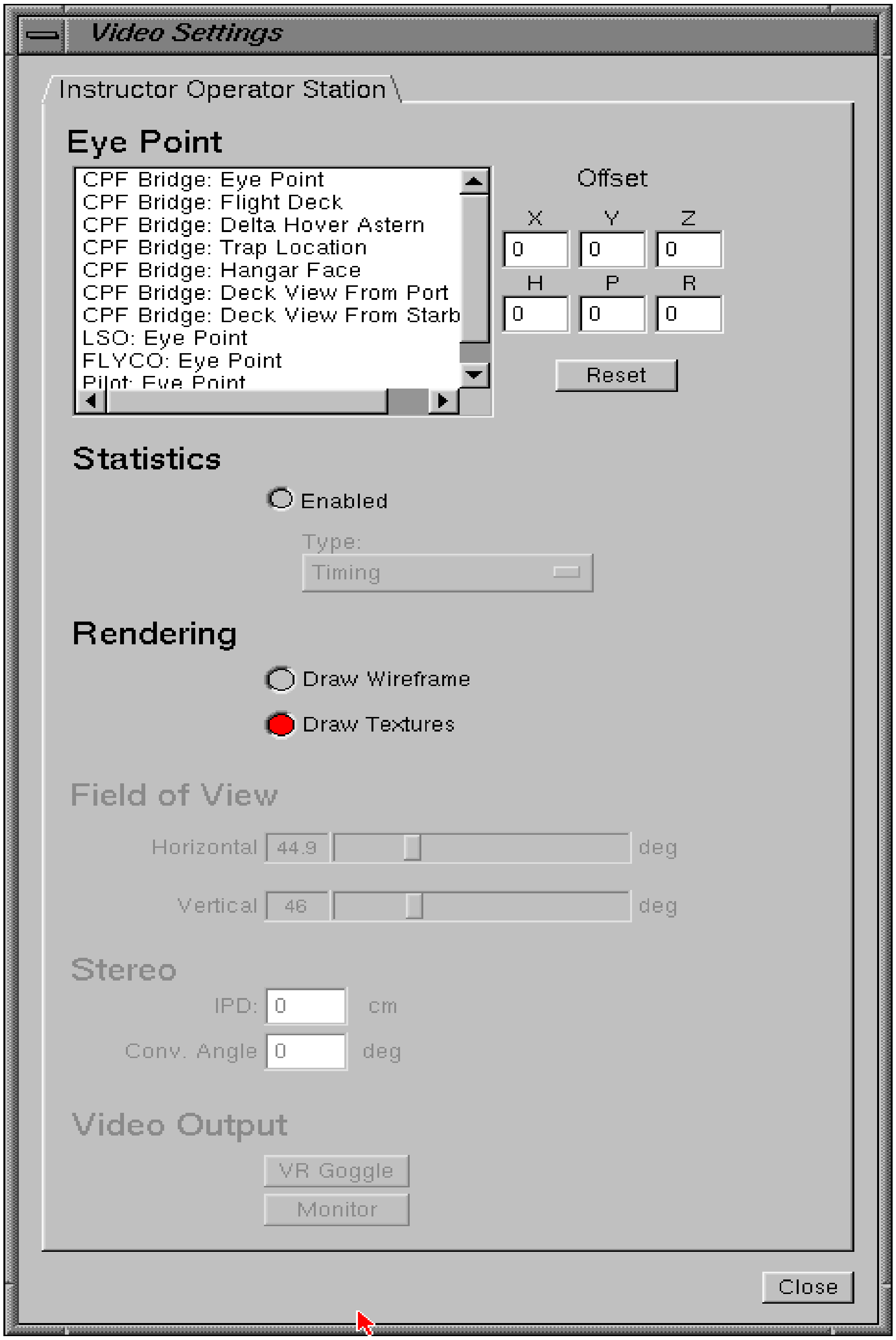

Figure 17 HelMET Pilot Control Video Settings

5.1.1.5 Test Inputs

The test inputs for the Daytime Launch scenario test case are described in Table 4.

5.1.1.6 Expected Test Results

The expected test results for the Daytime Launch scenario test case are described in Table 4.

5.1.1.7 Criteria for Evaluation Results

The following criteria are used to evaluate results:

- The helicopter has taken off from the flight deck of a CPF in a virtual environment.
- No failure has been found in the test case.
- If failures have been found, the test case must be repeated.

5.1.1.8 Assumptions and Constraints

The following assumptions and constraints are applicable:

- The pilot is a qualified maritime helicopter pilot. The pilot must be familiar with the CH 124 Sea King Helicopter Aircraft Operating Instructions.
- The pilot must be familiar with Canadian shipborne helicopter operating procedures.
- The Instructor must be familiar with Canadian shipborne helicopter operating procedures and the CH 124 Sea King Helicopter Aircraft Operating Instructions.
- The Instructor assumes the roles of Bridge, OOW, SAC, ASAC, FLYCO, and LSO in a scenario.
- All simulated models work according to Canadian shipborne helicopter operating procedures.

5.2 Night Time Freedeck Recovery Scenario Test

The Night Time Freedeck Recovery scenario test consists of a single test case.

5.2.1 Night Time Freedeck Recovery Scenario Test Case

5.2.1.1 Scenario Description

The current meteorological report indicates no overcast with unlimited visibility. The barometric pressure is 30 inches Mercury (i.e., 30.00 millibars or 760 mm Hg). The true wind is from 303 degrees at 17 knots. There are no wind gusts. The outside air temperature is 9 degrees Celsius.

A Canadian Patrol Frigate (CPF) is steaming on a course of 0 degrees at 5 knots on a clear night with sea state 5 conditions. The ship is pitching 3 degrees and rolling 10 degrees. The sea temperature is at 12 degrees Celsius.

The helicopter is on a course of 0 degrees. A visual flying rule (VFR) approach with an unrestricted mission control policy and recovery time of 20:00 hours local is expected.

All personnel are closed up at Flying Stations. At 19:50 hours local time, the LSO sets the ready recovery light to amber. Rendezvous instructions are passed and the helicopter is cleared to make an approach to the CPF. The helicopter has already passed through the 3 nautical mile checkpoint. The helicopter is conned to the final approach fix at 2 nautical miles aft of the ship. The helicopter's position is confirmed as it closes from 2 to 1 nautical mile astern of the ship.

Once the ship is visual, approach control is exchanged between the anti-submarine air controller (ASAC) and LSO. Clearance to make an approach is given and the helicopter transits to a hover on the portside of the ship. Next, the helicopter transits to a high hover over the RSD. Once a stable hover is established, the helicopter descends to a lower hover and maintains a low hover over the RSD. When the ready-to-land transmission is received, a steady period in deck motion is predicted and it is determined whether or not the main probe will enter the RSD capture area. The cautionary order "land now" is given and then the executive order "down, down, down" is given. The helicopter lands and is trapped in the RSD. Helicopter status and clear-to-manoeuvre are reported.

5.2.1.2 Implemented Scenario

The implemented scenario is as follows:

- Approach control is transferred from the SAC to the LSO.

- The helicopter is directly cleared for a freedeck landing or to proceed to a Delta Hover Astern position.
- If clearance to Delta Hover Astern has been given, the helicopter transits to the Delta Hover Astern position where clearance is obtained to proceed with Charlie Freedeck.
- The helicopter proceeds to a high hover on the portside of the ship.
- Next, the helicopter transits to a high hover over the RSD.
- Once a stable hover is established and when an appropriate steady period of ship motion is anticipated, the helicopter descends to the low hover posi¬tion asserting that it is ready to land.
- The LSO advises on helicopter position then gives the “land now” order.
- The helicopter drops into the trap and the arrester beams are closed.
- The helicopter tail probe is lowered.

5.2.1.3 Prerequisite Conditions

The prerequisite conditions for the Night Time Freedeck Recovery scenario are as follows:

- Sounding of flight stations 30 minutes before recovery time at 19:30 hours local.
- Deck side nets are lowered.
- The helicopter passes through the 3 nautical mile checkpoint.
- The LSO activates the recover light.
- OOW immediately responds NO.
- Data (including Charlie time, course, true wind, relative wind, and altime¬ter) are transmitted from the SAC to the helicopter.
- The SAC clears the helicopter for an approach.
- The helicopter co-pilot lowers the main probe and requests that the pilot put on the landing gear brakes. The pilot puts on the landing gear brakes.
- If requested by the LSO, FLYCO turns on the strobe lighting.
- The helicopter passes through the 2 nautical mile checkpoint.
- The helicopter is conned to the final approach fix (FAF). The ship is steered to final approach direction.
- OOW responds YES to recover light.
- FLYCO turns on centre lighting (CL) and horizontal reference system (HRS) lighting and sets deck status lights (DSL) to amber.
- The helicopter passes through the 1 nautical mile checkpoint.

- FLYCO turns on flight deck flood lights (FDFL), hangar face lighting (HFL), and hangar top lighting (HTL).
- Mutual visual contact is confirmed, at which time FLYCO turns off strobe light¬ing if it is already on.
- When non-flying crew (NFC) is close enough to estimate distances, the non-flying pilot (NFP) takes control while the flying pilot (FP) continues to watch the instruments. This case does not apply because a single helicopter pilot is in training.

5.2.1.4 Test Procedures

The test procedures for the Night Time Freedeck Recovery scenario test case are described in Table 5.

Table 5 Test Procedures for Night Time Freedeck Recovery Scenario Test Case

No.	Steps	Response	Verification
1	The Instructor checks that all the simulator subsystems are working properly.		
2	The Instructor checks that the Pilot has completed the pre-test steps, including emergency power off procedures, and is sitting in the pilot's seat with the safety harness strapped on.		
3	At the IOS display monitor, double-click on the "HelMET" icon to display the HelMET Training Window. Select "Manual Flight Mode (Cockpit)"		
4	At the IOS display monitor, Select "Pilot and IOS"	The HelMET IOS window is displayed on the IOS display monitor. An example of the	Verify that the "HelMET IOS" window is displayed: Pass/Fail.

No.	Steps	Response	Verification
		"HelMET IOS" window is shown in Figure 2 HelMET IOS Main Window. The "HelMET Pilot Control" window is displayed on the IOS display monitor. An example of the "HelMET Pilot Control" window is shown in Figure 5.	Verify that the "HelMET Pilot Control" window is displayed: Pass/Fail Verify that the red Platform, Tracker, Cereal Box, Sound and Conferencing indicators are displayed: Pass/Fail
5	On the "HelMET IOS" window, click on the "Initiate Session" icon	A "Select a Mission Plan" window is displayed on top of the "HelMET IOS" window. An example of the "Select a Mission Plan" window is shown in Figure 3.	Verify that the "Select a Mission Plan" window is displayed: Pass/Fail
6	On the "Select a Mission Plan" window, select the "Freedeck.mpn" mission plan for the predefined Freedeck Recovery scenario.	The mission plan filename "Freedeck.mpn" is appended to the complete file path where the predefined Freedeck Recovery mission plan will be loaded.	Verify that the mission plan filename "Freedeck.mpn" is displayed: Pass/Fail.
7	On the "Select a Mission Plan" window, click on the OK button	*The "Select a Mission Plan" window is closed and a "System Busy" window is displayed. An example of the "System Busy" window is shown in Figure 3 Select a Mission Plan Window* .	Verify that the mission plan filename "Freedeck.mpn" is displayed: Pass/Fail
8		After a few minutes, the "System Busy" window is closed	

No.	Steps	Response	Verification
9		At the bottom of the "HelMET IOS" window, the "Initiate Session", "Join Session", "Debrief Missions" and "Exit" icons are replaced by "Select Roles", "Start Session" and "End Session" icons.	Verify that the "Select Roles", "Start Mission" and "End Session" icons are displayed: Pass/Fail
10	At the "HelMET IOS" window, verify that the information for the specified mission plan is correct: Mission Plan Name: Freedeck Type: Deck Landing Procedures Details: Local Time: 20:00 Visibility: Unlimited Helo Position: Delta Hover Deck Motion: Custom Motion Lighting: Full Moon Altimeter (in hg): 29.00 Air Temperature (ºC): 12 Ship:		Verify that the specified mission plan contents are correct: Pass/Fail

No.	Steps	Response	Verification
	Heading: 0 deg Speed: 5.0 kts Wind: Heading: 303 deg Speed: 17 kts Primary Wave: Heading: 303 deg Height: 5.0 ft Period: 5.0 s		
11	On the HelMET Pilot Control" window, select the Video from the Settings pull-down menu.	The "Video Settings" window is displayed on the IOS display monitor. An example of the "Video Settings" window is shown in Figure 17.	Verify that the "Video Settings" window is displayed: Pass/Fail
12	On the "Video Settings" window, click on the "VR Goggle" button and then click on the "Close" button.		
13	At the Nvis SX60 Front Control Box, turn on the power supply to the HMD by activating the power on/off button		
14	On the HelMET Pilot Control" window, click on the "Join Session"	Two successive "System Busy" windows are displayed for a few minutes. An	Verify that the two "System Busy" windows are

No.	Steps	Response	Verification
	icon.	example of the “System Busy” window is shown in Figure 6.	displayed: Pass/Fail.
15	On the HelMET IOS” window, click on the “Start Session” icon.	At the “Participants” window, an “Initializing Mission” status message appears next to the IOS. An example of the “Init Mission” window is shown in Figure 7.	Verify that the “Initializing Mission” status message is displayed: Pass/Fail
16		A “System Busy” window is displayed for a few minutes	Verify that a “System Busy” window is displayed: Pass/Fail.
17	After the “System Busy” window is closed, check the device indicators for changes at the HelMET Pilot Control” window.	Verify that the green Tracker, Cereal Box, Sound and Conference indicators are displayed: Pass/Fail	Verify that the red Platform indicator is displayed: Pass/Fail Verify with Pilot that the left and right eye views are displayed in the HMD: Pass/Fail
18	The Instructor requests the Pilot to put on the HMD with the headset and microphone.		
19	The Instructor puts on the headset and microphone.		
20	The Instructor verifies the operation of the headset and microphone with the Pilot.		
21	On the HelMET Pilot Control” window, click on the “Fwd/Aft”, “Up/Down”, “Heading” and “Left/Right” buttons	The pilot’s view displayed on the repeater display monitor should have moved accordingly.	Verify that the pilot’s view has moved accordingly on the repeater display monitor: Pass/Fail

No.	Steps	Response	Verification
	to adjust the Pilot eyepoint control for viewing.		
22	Release the Stop button located at the Instructor Operator Station.	The electrical power is applied to the Motion Platform Subsystem EMS motor drives.	Verify that the green L2-MOTION POWER ON Light indicator, located on the Electrical Power Control Panel is illuminated: Pass/Fail.
23	On the HelMET Pilot Control” window, click on the Platform Control “Start”, button to enable power to the Motion Platform Subsystem.	The “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window is displayed.	Verify that the “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window is displayed: Pass/Fail
24	On the “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window, click on the “Yes” button.	After the “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window is closed, the green Platform indicator is displayed at the HelMET Pilot Control” window.	After a few seconds, verify that the green Platform indicator is displayed: Pass/Fail.
25	On the HelMET Pilot Control” window, click on the “Ready” button.	The “Pilot Reminder” window is displayed. An example of the “Pilot Reminder” window is shown in Figure 9.	Verify that the “Pilot Reminder” window is displayed: Pass/Fail
26	On the “Pilot Reminder” window, click on the “Yes” button.	The “Pilot Reminder” window is closed.	Verify that the “Pilot Reminder” window is closed: Pass/Fail

No.	Steps	Response	Verification
27		At the HelMET Pilot Control" window, the Participant status message (Pilot Control Ready for Missions) is displayed.	Verify that the Participant status message (Pilot Control Ready For Mission) is displayed: Pass/Fail
28		At the HelMET IOS" window, the Participant status message (Pilot Control Ready for Mission) is displayed	Verify that the Participant status message (Pilot Control Ready For Mission) is displayed: Pass/Fail
29	On the HelMET IOS" window, click on the "Ready" button.	The green Ready button indicator is displayed. The "Start Mission" button is available.	Verify that the green Ready button indicator is displayed: Pass/Fail Verify that the "Start Mission" button is available: Pass/Fail.
30		At the "Ship Control" window, the 1 Mile lighting button is displayed.	Verify that the 1 Mile lighting button is displayed: Pass/Fail
31		At the "Cable Tension Control" window, the Cable Tension value of 0 lbs is displayed.	Verify that the Cable Tension value of 0 lbs is displayed: Pass/Fail
32		At the "Trafficator Lights" window, the Red, Green and Off trafficator lights are not selected.	Verify that the Red, Green and Off Trafficator lights are not selected: Pass/Fail
33		At the "Trafficator Lights" window, the amber trafficator light is displayed	Verify that the amber trafficator light is displayed: Pass/Fail
34		At the "Hauldown Control" window, the Tail Probe Up indicator is displayed	Verify that the TAIL Probe Up indicator is displayed: Pass/Fail

No.	Steps	Response	Verification
35		At the “Hauldown Control” window, the Main Probe Down indicator is displayed	Verify that the Main Probe Down indicator is displayed: Pass/Fail
36		At the “Hauldown Control” window, the Messenger Separated indicator is displayed.	Verify that the Messenger Separated indicator is displayed: Pass/Fail
37		At the “Hauldown Control” window, the Landing Gear Up icon is displayed	Verify that the Landing Gear Up icon is displayed: Pass/Fail
38		At the “Trap Control” window, the RSD trap is open.	Verify that the RSD trap is open: Pass/Fail
39		At the “Trap Control” window, the Helo Trapped indicator is not displayed.	Verify that the Helo Trapped indicator is not displayed: Pass/Fail
40		At the “Helo Status” window, the Winch indicator is displayed with the OFF value.	Verify that the Winch indicator is displayed with the OFF value: Pass/Fail
41		At the “Helo Status” window, the green Main Probe Down indicator is displayed.	Verify that the green Main Probe Down indicator is displayed: Pass/Fail
42		At the “Helo Status” window, the Tail Probe Down indicator is not displayed	Verify that the Tail Probe Down indicator is not displayed: Pass/Fail
43		At the “Helo Status” window, the green Trapped indicator is not displayed	Verify that the green Trapped indicator is not displayed: Pass/Fail
44		At the “Ship Status” window, check the ship heading and speed, true wind direction and	Verify that the ship heading and speed, true wind heading and speed, relative wind and

No.	Steps	Response	Verification
		speed, relative wind direction and speed, and altimeter for correctness	speed, and altimeter are correct: Pass/Fail□
45		At the “Situation Awareness” window, the RSD trap is open and the red flag is in the down position	Verify that the RSD red flag is in the down position: Pass/Fail
46		At the “Situation Awareness” window, the green YES and amber RCVR buttons are displayed.	Verify that the green YES and amber RCVR buttons are displayed: Pass/Fail
47		At the “Situation Awareness” window, the amber trafficator light is displayed.	Verify that the amber trafficator light is displayed: Pass/Fail
48		the “Situation Awareness” window, the Cable Tension value of 0 lbs is displayed.	Verify that the Cable Tension value of 0 lbs is displayed: Pass/Fail
49	On the HelMET IOS” window, click on the “Start Mission” button.	The green mission status indicator is displayed to indicate that the mission has started. An example of the HelMET IOS running window is shown in Figure 10.	Verify that the green Mission status indicator is displayed: Pass/Fail
50	The Instructor calls: “Bird boat call paddles for control”.		
51	The Pilot calls: “Boat bird roger break break paddles bird calling for control”.		
52	The Instructor calls: “Bird paddles roger <pause> signal Charlie		

No.	Steps	Response	Verification
	freedeck".		
53	On the "Trafficator Lights" window, click on the green trafficator light.	At the "Situation Awareness" window, the green trafficator light is displayed.	Verify that the green trafficator light is displayed: Pass/Fail
54	The Pilot ensures that the green trafficator light is on.		Verify that the Pilot can see the green trafficator light from the HMD: Pass/Fail
55	The Instructor monitors mission, helo status and initiates Wave_Off as required.		
56	The Instructor evaluates the ship deck motion at the "Ship Status" window.		
57	The Instructor monitors the relative wind speed and direction.		
58	The Instructor monitors the helicopter position		
59	The Pilot controls the helicopter to hover port side.		
60	The Instructor is to monitor flight instruments for aircraft positioning.		
61	When the single engine speed is dropping below the safe limit, the Instructor (NFC) reports a "Safe single engine		

No.	Steps	Response	Verification
	speed”.		
62	The Pilot controls the helicopter to high hover over the RSD		
63	On the “Hauldown Control” window, click the Landing Gear Down button.	At the “Hauldown Control” window, the Landing Gear Down icon is displayed	Verify that the Landing Gear Down icon is displayed: Pass/Fail
64	The Pilot ensures that the helicopter landing gear is down.		
65	The Instructor calls: “Two down and locked, bug light my side”.		
66	The Pilot calls: “Bug light my side”.		
67	The Instructor is to advise on the helicopter fore/aft position. The Instructor calls: “Steady”, “Back one”, “Ahead three”, or “Good position”.		
68	The Pilot controls the helicopter to arrive at hover over the RSD.		
69	On the “Trafficator Light” window, click on the amber trafficator light.	At the “Situation Awareness” window, the amber trafficator light is displayed	Verify that the amber trafficator light is displayed: Pass/Fail
70	The Pilot ensures that the amber trafficator light is on		Verify that the Pilot can see the amber trafficator light: Pass/Fail

No.	Steps	Response	Verification
71	The Instructor is to advise on the helicopter position. The Instructor calls: “Steady”, “Back one”, “Ahead three”, or “Good position”.		
72	The Pilot is to maintain the helicopter in a stable hover position.		
73	The Pilot monitors the natural horizon, checks the horizontal reference bars, and evaluates the ship motion for steady period.		
74	The Pilot controls the helicopter to low hover over the RSD.		
75	The Pilot monitors the ship position relative to hangar line-up lines.		
76	The Instructor is to advise on the helicopter position by calling: “Steady”, “Back one”, “Ahead three”, “Drifting”, or “Good position”.		
77	The Pilot maintains the helicopter in a stable hover position, monitors the helicopter fore/aft positions based on updates from the Instructor, and makes		

No.	Steps	Response	Verification
	position adjustments.		
78	The Pilot controls the helicopter in a stable hover position.		
79	The Pilot calls: “Ready to land”.		
80	If the Main Probe will not enter the RSD, the Instructor transmits position corrections by calling: “Left”, “Right”, “Ahead”, “Back”, “Up”, “Down”, or “Steady”.		
81	If the ship motion is not steady, the Instructor awaits next steady period.		
82	The Instructor calls: “Land now, down down down”.		
83	n the “Trafficator Lights” window, click on the green trafficator light.	At the “Situation Awareness” window, the green trafficator light is displayed.	Verify that the green trafficator light is displayed: Pass/Fail
84	The Pilot lands the helicopter on the ship deck.		
85	The Instructor observes that the helicopter has landed on the ship.		Verify that the helicopter has landed on the flight deck: Pass/Fail
86	The Instructor observes that the Main Probe enters the RSD capture area.		

No.	Steps	Response	Verification
87	On the “Trap Control” window, click on the RSD trap.	At the “Trap Control” window, the RSD trap is closed.	Verify that the RSD trap is closed: Pass/Fail
88		At the “Situation Awareness” window, the RSD red flag is up.	Verify that the RSD red flag is up: Pass/Fail
89	The Instructor calls: “Bridge LSO Helo is trapped on deck. You are clear to manoeuvre”.		
90	On the HelMET IOS” window, click on the “Pause” button.	The yellow HelMET IOS Status and Pause button indicator are displayed. An example of the HelMET IOS Pause window is shown in Figure 11	Verify that the yellow HelMET IOS indicator is displayed: Pass/Fail
91	On the HelMET IOS” window, click on the “Stop” button.	A HelMET IOS” window with the Close button is displayed	Verify that the Close” button is displayed at the IOS window: Pass/Fail
92	On the HelMET Pilot Control” window, click on the Platform Control “Stop” button to remove power to the Motion Platform Subsystem EMS motors.	The “System Busy” window is displayed for a few minutes.	
93	Press the Stop button located at the Instructor Operator Station.		Verify that the green L2-MOTION POWER ON Light indicator, located on the Electrical Power Control Panel is not illuminated: Pass/Fail
94	At the Nvis SX60 control Box, turn off the power		

No.	Steps	Response	Verification
	supply by depressing the power on/off button.		
95	On the HelMET Pilot Control” window, select the Video Settings from the Settings pull-down menu.	The “Video Settings” window is displayed on the IOS display monitor.	Verify that the “Video Settings” window is displayed: Pass/Fail
96	On the “Video Settings” window, click on the “Monitor” button.	The “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window is displayed on the IOS display monitor.	Verify that the “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window is displayed on the IOS display monitor: Pass/Fail
97	On the “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window and click the “Yes” button.	The “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window is closed.	
98	On the “Video Settings” window, click on the “Close” button.	The “Video Settings” window is closed.	Verify that the “Video Settings” window is closed: Pass/Fail
99	On the HelMET IOS” window, click on the “Close” button.	The “Save missions for later review?” dialog window is displayed. An example of the “Save missions for later review?” dialog window is shown in Figure 13.	Verify that the “Save missions for later review?” dialog window is displayed: Pass/Fail
100	On the “Save missions for later review?” dialog	The “Save missions for later review?” dialog window is	Verify that the “Save missions for later review?”

No.	Steps	Response	Verification
	window, click on the “Yes” button	closed	dialog window is closed: Pass/Fail
101		The “Enter the name of the file to save the mission” window is displayed. An example of the “Enter the name of the file to save the mission” window is shown in Figure 14.	Verify that the “Enter the name of the file to save the mission” window is displayed: Pass/Fail
102	On the “Enter the name of the file to save the mission” window, enter a filename with extension (e.g. freedeck_1.log) and click on the “OK” button.	The “Enter the name of the file to save the mission” window is closed and the HelMET IOS” window with an “End Session” icon is displayed. An example of the HelMET IOS window is shown in Figure 12.	Verify that the “Enter the name of the file to save the mission” window is closed and the HelMET IOS” window with an “End Session” icon is displayed: Pass/Fail
103	On the HelMET IOS” window, click on the “End Session” icon.	The “The master has closed the session” window is displayed. An example of the “The master has closed the session” window is shown in *Figure 15*.	Verify that the “The master has closed the session” window is displayed: Pass/Fail
104	On the “The master has closed the session” window, click on the “OK” button.	The “The master has closed the session” window is closed.	Verify that the “The master has closed the session” window is closed: Pass/Fail
105	On the HelMET IOS” window, click on the “Review Missions” icon	The HelMET IOS” window with a list of filenames is displayed	Verify that the HelMET IOS” window with a list of filenames is displayed: Pass/Fail
106	On the HelMET IOS” window, select the previously entered filename (e.g. freedeck_1.log) and click		

No.	Steps	Response	Verification
	on the “OK” button.		
107	On the HelMET IOS” window, select the LSO Model: EyePoint from the Available Viewpoints.	The LSO Model viewpoint is displayed on the HelMET IOS” window. An example of the HelMET IOS” window is shown in Figure 16	Verify that the LSO Model view point is displayed on the HelMET IOS” window: Pass/Fail
108	On the HelMET IOS” window, select the double right arrow button to replay at a fast forward speed.	The LSO Model viewpoint is redisplayed at a fast forward speed	Verify that the LSO Model view point is redisplayed at a fast forward speed: Pass/Fail
109	On the HelMET IOS” window, click on the “Close” button		
110	On the HelMET IOS” window, click on the “Exit” icon.	The HelMET IOS” window is closed	Verify that the HelMET IOS” window is closed: Pass/Fail.
111	On the HelMET Pilot Control” window, click on the “Exit” icon.	The HelMET Pilot Control” window is closed.	Verify that the HelMET Pilot Control” window is closed: Pass/Fail
112	The Instructor removes the headset and microphone.		
113	The Instructor requests the Pilot to close his eyes for a few seconds.		
114	After a few seconds, the Instructor requests the Pilot to remove the HMD.		
115	The Instructor places the HMD in a holder at the		

No.	Steps	Response	Verification
	back of the pilot's seat.		
116	The Instructor helps the Pilot to remove the safety harness.		
117	The Instructor helps the Pilot step down from the Motion Platform.		

5.2.1.5 Test Inputs

The test inputs for the Night Time Freedeck Recovery Scenario test case are described in Table 5.

5.2.1.6 Expected Test Results

The expected test results for the Night Time Freedeck Recovery Scenario test case are described in Table 5.

5.2.1.7 Criteria for Evaluation Results

The following criteria are used to evaluate results:

- The pilot has landed the helicopter on the flight deck in a virtual environment.
- No failure has been found in the test case.
- If failures have been found, the test case must be repeated.

5.2.1.8 Assumptions and Constraints

The following assumptions and constraints are applicable:

- The pilot is a qualified maritime helicopter pilot. The Pilot must be familiar with the CH 124 Sea King Helicopter Aircraft Operating Instructions.
- The pilot must be familiar with Canadian shipborne helicopter operating procedures.

- The Instructor must be familiar with Canadian shipborne helicopter operating procedures and the CH 124 Sea King Helicopter Aircraft Operating Instructions.
- The Instructor assumes the roles of Bridge, OOW, SAC, ASAC, FLYCO, and LSO in a scenario.
- All simulated models work according to Canadian shipborne helicopter operating procedures.

5.3 Daytime Hauldown Recovery Scenario Test

The Daytime Hauldown Recovery scenario test consists of a single test case.

5.3.1 Daytime Hauldown Scenario Test Case

5.3.1.1 Scenario Description

The meteorological report indicates no overcast with unlimited visibility. Barometric pressure is 30 inches Mercury (i.e., 30.00 millibars or 760 mm Hg). True wind is from 270 degrees at 30 knots. There are no wind gusts. The outside air temperature is 11 degrees Celsius.

A Canadian Patrol Frigate (CPF) is steaming on a course of 285 degrees at 10 knots on a clear day with sea state 6 conditions. The ship is pitching 3 degrees and rolling 15 degrees. The sea is running from 300 degrees with waves 4 to 6 feet in height. The swell is running from 240 degrees at 10 second intervals at a height of 10 feet. The sea temperature is 9 degrees Celsius.

The helicopter is on a course of 285 degrees 1 nautical mile aft of the CPF. It is to be recovered during daylight at 14:10 hours local via the Recovery Assist, Secure, and Traverse (RAST) system. A visual flight rules approach with an unrestricted mission control policy is in effect.

All personnel are closed up at Flying Stations. At 14:00 hours local time, the pilot reports that the CPF is visible. Control is transferred between the ASAC and LSO. The helicopter transits to a hover on the portside of the ship. After putting the landing gear brakes on, the helicopter flies to a hover starboard of the RSD and lowers the messenger cable. The deck crew retrieve the messenger cable and connect it with the hauldown cable. After receiving clearance, the deck crew return to their previous positions. The cables are raised into the helicopter and once seated and

separated, a report is made to the LSO. The LSO engages hauldown mode on the RAST console and reports tension on.

The helicopter transits to a high hover over the RSD. Once a stable hover is established, the helicopter descends to a low hover over the RSD. When the ready-to-land message is received, a steady period in deck motion is predicted, and it is determined whether or not the main probe will enter the RSD capture area. The cautionary order “land now” is given and then the executive order “down, down, down” is given. The helicopter lands and is trapped in the RSD. The tail probe is lowered and its position reported. Helicopter status and clear-to-manoeuvre message are reported.

5.3.1.2 Implemented Scenario

The implemented scenario is as follows:

- Approach control is transferred from the ASAC to the LSO.
- The helicopter is directly cleared for a hauldown landing or to proceed to a Delta Hover Astern position.
- If clearance to Delta Hover Astern has been given, the helicopter transits to the Delta Hover Astern position whence clearance is obtained to proceed with Charlie Hauldown.
- The helicopter proceeds to a high hover on the portside of the ship.
- Next, the helicopter transits to a high hover starboard of the RSD and lowers the messenger cable.
- The deck crew grounds the cable and mates the messenger cable with the hauldown cable.
- The deck crew returns to their positions as the cable is raised.
- The cable is raised, seated, and separated.
- A report is made to the LSO.
- The LSO engages hauldown mode and reports tension on.
- The helicopter transits to a high hover over the RSD.
- Once a stable hover is established and when an appropriate steady period of ship motion is anticipated, the helicopter descends to the low hover posi¬tion asserting that it is ready to land.
- The LSO advises on helicopter position then gives the “land now” order at which time maximum requested tension is applied.

5.3.1.3 Prerequisite Conditions

The prerequisite conditions for the Daytime Hauldown Recovery scenario are as follows:

- Sounding of flight stations 30 minutes before recovery time at 14:10 hours local. Deck side nets are lowered.
- The helicopter passes through the 3 nautical mile checkpoint.
- The LSO activates the recover light.
- OOW immediately responds NO.
- Data (including Charlie time, course, true wind, relative wind, and altime¬ter) are transmitted from the SAC to the helicopter.
- The need for a hauldown recovery is communicated and confirmed.
- ASAC clears the helicopter for an approach.
- The helicopter co-pilot lowers the main probe and requests that the pilot put on the landing gear brakes. The pilot puts on the landing gear brakes.
- The helicopter passes through the 2 nautical mile checkpoint.
- The helicopter is conned to the final approach fix (FAF).
- OOW responds YES to recover light.
- FLYCO sets deck status lights (DSL) amber.
- The helicopter passes through the 1 nautical mile checkpoint.
- Mutual visual contact is confirmed.

5.3.1.4 Test Procedures

The test procedures for the Daytime Hauldown scenario test case are described in Table 6.

Table 6 Test Procedures for Daytime Hauldown Scenario Test Case

No.	Steps	Response	Verification
1	The Instructor checks that all the simulator subsystems are working properly.		
2	The Instructor checks that the Pilot has completed the pre-test procedures, including emergency power-off		

No.	Steps	Response	Verification
	procedures, and is sitting in the pilot's seat with the safety harness strapped on.		
3	At the IOS display monitor, double-click on the "HelMET" icon to display the HelMET Training Window. Select "Manual Flight Mode (Cockpit)"		
4	At the IOS display monitor, Select "Pilot and IOS"	The "HelMET IOS" window is displayed on the IOS display monitor. An example of the HelMET IOS window is shown in Figure 2. The "HelMET Pilot Control" window is displayed on the IOS display monitor. An example of the "HelMET Pilot Control" window is shown in Figure 5.	Verify that the "HelMET IOS" window is displayed: Pass/Fail. Verify that the "HelMET Pilot Control" window is displayed: Pass/Fail Verify that the red Platform, Tracker, Cereal Box, Sound and Conferencing indicators are displayed: Pass/Fail
5	On the "HelMET IOS" window, click on the "Initiate Session" icon.	A "Select a Mission Plan" window is displayed on top of the "HelMET IOS" window. An example of the "Select a Mission Plan" window is shown in Figure 3.	Verify that the "Select a Mission Plan" window is displayed: Pass/Fail
6	On the "Select a Mission Plan" window, select the "Hauldown.mpn" mission plan for the predefined Daytime Launch scenario.	The mission plan filename "Hauldown.mpn" is appended to the complete file path where the predefined Daytime Launch mission plan will be loaded.	Verify that the mission plan filename "Hauldown.mpn" is displayed: Pass/Fail.

No.	Steps	Response	Verification
7	On the “Select a Mission Plan” window, click on the OK button	The “Select a Mission Plan” window is closed and a “System Busy” window is displayed. An example of the “System Busy” window is shown in Figure 4.	Verify that the “System Busy” window is displayed: Pass/Fail
8		After a few seconds, the “System Busy” window is closed	
9		At the bottom of the “HelMET IOS” window, the “Initiate Session”, “Join Session”, “Debrief Missions” and “Exit” icons are replaced by “Select Roles”, “Start Session” and “End Session” icons.	Verify that the “Select Roles”, “Start Mission” and “End Session” icons are displayed: Pass/Fail
10	At the “HelMET IOS” window, verify that the information for the specified mission plan is correct: Mission Plan Name: HaulDown Type: Deck Landing Procedures Details: Local Time: 14:10 Visibility: Unlimited Helo Position: Delta Hover		Verify that the specified mission plan contents are correct: Pass/Fail

No.	Steps	Response	Verification
	Deck Motion: Custom Motion Lighting: Day Altimeter (in hg): 29.00 Air Temperature (ºC): 11 Ship: Heading: 285 deg Speed: 10.0 kts Wind: Heading: 270 deg Speed: 30 kts Primary Wave: Heading: 270 deg Height: 5.0 ft Period: 5.0 s		
11	On the “HelMET Pilot Control” window, select the Video from the Settings pull-down menu.	The “Video Settings” window is displayed on the IOS display monitor. An example of the “Video Settings” window is shown in Figure 17.	Verify that the “Video Settings” window is displayed: Pass/Fail
12	On the “Video Settings” window, click on the “VR Goggle” button and then click		

No.	Steps	Response	Verification
	on the “Close” button.		
13	At the NVis SX60 Front Control Box, turn on the power supply to the HMD by activating the power on/off button.		
14	On the “HelMET Pilot Control” window, click on the “Join Session” icon	Two successive “System Busy” windows are displayed for a few minutes. An example of the “System Busy” window is shown in Figure 6.	Verify that the two “System Busy” windows are displayed: Pass/Fail.
15	On the “HelMET IOS” window, click on the “Start Session” icon.	At the “Participants“ window, an “Initializing Mission” status message appears next to the IOS. An example of the “Init Mission” window is shown in Figure 7.	Verify that the “Initializing Mission” status message is displayed: Pass/Fail
16		A “System Busy” window is displayed for a few minutes.	Verify that a “System Busy” window is displayed: Pass/Fail.
17	After the “System Busy” window is closed, check the device indicators for changes at the “HelMET Pilot Control” window.		Verify that the green Tracker, Cereal Box, Sound and Conference indicators are displayed: Pass/Fail Verify that the red Platform indicator is displayed: Pass/Fail Verify with Pilot that the left and right eye views are displayed in the HMD: Pass/Fail
18	The Instructor requests the Pilot to put on the HMD with the		

No.	Steps	Response	Verification
	headset and microphone.		
19	The Instructor puts on his headset and microphone.		
20	The Instructor verifies the operation of the headset and microphone with the Pilot.		
21	On the “HelMET Pilot Control” window, click on the “Fwd/Aft”, “Up/Down”, “Heading” and “Left/Right” buttons to adjust the Pilot eyepoint control for viewing.	The pilot’s view displayed on the repeater display monitor should have moved accordingly.	Verify that the pilot’s view has moved accordingly on the repeater display monitor: Pass/Fail
22	Release the Stop button located at the Instructor Operator Station. Verify that the green L2	The electrical power is applied to the Motion Platform Subsystem EMS motor drives.	Verify that the green L2-MOTION POWER ON Light indicator, located on the Electrical Power Control Panel, is illuminated: Pass/Fail
23	On the “HelMET Pilot Control” window, click on the Platform Control “Start”, button to enable power to the Motion Platform Subsystem.	The “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window is displayed.	Verify that the “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window is displayed: Pass/Fail
24	On the “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window,	After the “Is the Motion Platform power on with an amber and a red light? Not following the correct procedure could cause the platform to behave violently!” dialog window is closed, the	After a few seconds, verify that the green Platform indicator is displayed: Pass/Fail

No.	Steps	Response	Verification
	click on the “Yes” button.	green Platform indicator is displayed at the “HelMET Pilot Control” window.	
25	On the “HelMET Pilot Control” window, click on the “Ready” button.	The “Pilot Reminder” window is displayed. An example of the “Pilot Reminder” window is shown in Figure 9.	Verify that the “Pilot Reminder” window is displayed: Pass/Fail
26	On the “Pilot Reminder” window, click on the “Yes” button.	The “Pilot Reminder” window is closed.	Verify that the “Pilot Reminder” window is closed: Pass/Fail
27	At the “HelMET Pilot Control” window, the Participant status message (Pilot Control Ready for Missions) is displayed.	Verify that the Participant status message (Pilot Control Ready For Mission) is displayed: Pass/Fail	At the “HelMET Pilot Control” window, the Participant status message (Pilot Control Ready for Missions) is displayed.
28	At the “HelMET IOS” window, the Participant status message (Pilot Control Ready for Mission) is displayed.	Verify that the Participant status message (Pilot Control Ready For Mission) is displayed: Pass/Fail	At the “HelMET IOS” window, the Participant status message (Pilot Control Ready for Mission) is displayed.
29	On the “HelMET IOS” window, click on the “Ready” button.	The green Ready button indicator is displayed. The “Start Mission” button is available.	Verify that the green Ready button indicator is displayed: Pass/Fail Verify that the “Start Mission” button is available: Pass/Fail.
30		At the “Ship Control” window, no lighting buttons are displayed.	Verify that the no lighting buttons are displayed: Pass/Fail
31		At the “Cable Tension	Verify that the Cable

No.	Steps	Response	Verification
		Control" window, the Cable Tension value of 0 lbs is displayed.	Tension value of 0 lbs is displayed: Pass/Fail
32		At the "Trafficator Lights" window, the Red, Green and Off trafficator lights are not selected.	Verify that the Red, Green and Off Trafficator lights are not selected: Pass/Fail
33		At the "Trafficator Lights" window, the amber trafficator light is displayed.	Verify that the amber trafficator light is displayed: Pass/Fail
34		At the "Hauldown Control" window, the Tail Probe Up indicator is displayed.	Verify that the Tail Probe Up indicator is displayed: Pass/Fail
35		At the "Hauldown Control" window, the Main Probe Down indicator is displayed.	Verify that the Main Probe Down indicator is displayed: Pass/Fail
36		At the "Hauldown Control" window, the Messenger Separated indicator is displayed.	Verify that the Messenger Separated indicator is displayed: Pass/Fail
37		At the "Hauldown Control" window, the Landing Gear Up icon is displayed.	Verify that the Landing Gear Up icon is displayed: Pass/Fail
38		At the "Trap Control" window, the RSD trap is open.	Verify that the RSD trap is open: Pass/Fail
39		At the "Trap Control" window, the Helo Trapped indicator is not displayed.	Verify that the Helo Trapped indicator is not displayed: Pass/Fail
40		At the "Helo Status" window, the Winch indicator is displayed with the OFF value.	Verify that the Winch indicator is displayed with the OFF value:

No.	Steps	Response	Verification
			Pass/Fail
41		At the “Helo Status” window, the green Main Probe Down indicator is displayed.	Verify that the green Main Probe Down indicator is displayed: Pass/Fail
42		At the “Helo Status” window, the Tail Probe Down indicator is not displayed.	Verify that the Tail Probe Down indicator is not displayed: Pass/Fail
43		At the “Helo Status” window, the green Trapped indicator is not displayed.	Verify that the green Trapped indicator is not displayed: Pass/Fail
44		At the “Ship Status” window, check the ship heading and speed, true wind direction and speed, relative wind direction and speed, and altimeter for correctness.	Verify that the ship heading and speed, true wind heading and speed, relative wind and speed, and altimeter are correct: Pass/Fail
45		At the “Situation Awareness” window, the RSD trap is open and the red flag is in the down position.	Verify that the RSD red flag is in the down position: Pass/Fail
46		At the “Situation Awareness” window, the green YES and amber RCVR buttons are displayed.	Verify that the green YES and amber RCVR buttons are displayed: Pass/Fail
47		At the “Situation Awareness” window, the amber trafficator light is displayed.	Verify that the amber trafficator light is displayed: Pass/Fail
48		At the “Situation Awareness” window, the Cable Tension value of 0 lbs is displayed.	Verify that the Cable Tension value of 0 lbs is displayed: Pass/Fail

No.	Steps	Response	Verification
49	On the “HelMET IOS” window, click on the “Start Mission” button.	The green mission status indicator is displayed to indicate that the mission has started. An example of the HelMET IOS running window is shown in Figure 10.	Verify that the green Mission status indicator is displayed: Pass/Fail
50	The Instructor (OOW) calls: “Bird boat call paddles for control”.		
51	The Pilot calls: “Boat bird roger break break paddles bird calling for control”.		
52	The Instructor calls: “Bird paddles roger <pause> signal harlie hauldown”.		
53	On the “Trafficator Lights” window, click on the green trafficator light.	At the “Situation Awareness” window, the green trafficator light is displayed.	Verify that the green trafficator light is displayed: Pass/Fail
54	The Pilot ensures that the green trafficator light is displayed.		Verify that the Pilot can see the green trafficator light: Pass/Fail
55	The FLYCO monitors mission, helo status and initiates Wave_Off as required.		
56	The Instructor evaluates the ship deck motion, monitors the relative wind speed and direction, and monitors the helicopter position.		
57	The Instructor (NFC) maintains to monitor flight instruments		

No.	Steps	Response	Verification
	for aircraft positioning.		
58	The Pilot controls the helicopter to hover port side.		
59	When the single engine speed is dropping below the safe limit, the Instructor (NFC) reports a “Safe single engine speed”.		
60	The Pilot controls the helicopter to high hover over the RSD.		
61	On the “Hauldown Control” window, click the Landing Gear Down button.	At the “Hauldown Control” window, the Landing Gear Down icon is displayed.	Verify that the Landing Gear Down icon is displayed: Pass/Fail
62	The Pilot ensures that the helicopter landing gear is down.		
63	The Instructor (NFC) calls: “Two down and locked, bug light my side”.		
64	The Pilot calls: “Bug light my side”.		
65	The Instructor (NFC) advises on the helicopter fore/aft position by calling: “Steady”, “Back one”, “Ahead three”, or “Good position”.		
66	The Pilot controls the helicopter to arrive at hover over the RSD.		
67	The Pilot maintains the helicopter in a stable hover position.		

No.	Steps	Response	Verification
68	The Pilot calls: “Lower the messenger”.		
69	On the “Hauldown Control” window, click on the Messenger Down button.	Wait for a few minutes. At the “Hauldown Control” window, the OUT display indicator is displayed.	Verify that the OUT display indicator is displayed: Pass/Fail
70	The Deck Crew moves into position and ground the messenger cable.		
71	The Instructor calls: “Stop lowering”.		
72	Crew connect the messenger cable and H/D cables.		
73	On the “Hauldown Control” window, click on the Messenger OFF button.	At the “Helo Status” window, the Winch indicator is changed from OUT to JOINED.	Verify that the Winch indicator is JOINED: Pass/Fail
74	On the “Trafficator Lights” window, select the Amber trafficator light.	At the “Situation Awareness” window, the amber trafficator light is displayed.	Verify that the amber trafficator light is displayed: Pass/Fail
75	The Pilot maintains the helicopter in a stable hover position.		
76	The Instructor (NFC) provides a signal to stop lowering		
77	The Deck crew provide a signal to raise the cable.		
78	The Instructor monitors the Deck Crew position.		

No.	Steps	Response	Verification
79	The Instructor calls: “Raise the messenger”.		
80	On the “Trafficator Lights” window, select the green trafficator light.	At the “Situation Awareness” window, the green trafficator light is displayed.	Verify that the green trafficator light is displayed: Pass/Fail
81	On the “Hauldown Control” window, click the Messenger Up button.	At the “Situation Awareness” window, the Winch indicator is changed from JOINED to 3_GREEN.	Verify that the Winch indicator is 3 _GREEN: Pass/Fail
82	The Instructor ensures that the Winch cable is not fouled.		
83	The Instructor ensures that the Winch cable is steady while it is being raised.		
84	The Instructor ensures that the Main Probe retracts and extends.		
85	The Deck Crew leave the flight deck.		
86	The Instructor (NFC) monitors the Haul Down Panel.		
87	The Instructor (NFC) ensures that the Winch cable is seated and separated.	At the “Hauldown Control” window, the Messenger SEPARATED and LOCKED IN indicators are displayed.	Verify that the Messenger SEPARATED and LOCKED IN indicators are displayed: Pass/Fail
88	The next few steps must be executed in a very fast sequence.		

No.	Steps	Response	Verification
89	The Instructor (NFC) calls: “Three green”.		
90	The Pilot calls: “Three green hover tension max tension is 850 pounds”.		
91	On the “Cable Tension Control” window, click on the Min button.	At the “Cable Tension Control” window, the green Min button indicator is displayed.	Verify that the green Min button indicator is displayed: Pass/Fail
92	The Instructor engages the H/D mode.		
93	The Instructor (NFC) advises on the helicopter fore/aft position by calling: “Steady”, “Back”, “Ahead”, “Drifting” or “Good Position”.		
94	The Instructor checks that the amber H/D light is lit.		
95	The Instructor checks that the 2 Ft/Sec light is lit.		
96	The Instructor checks the tension meter between (200-400) pounds at the “Situation Awareness” window.		
97	The Pilot maintains the helicopter in a stable hover position.		
98	The Instructor ensures that the cable reels in at approximately 2 ft/sec.		

No.	Steps	Response	Verification
99	The Instructor observes the cable until it is taut.		
100	At the “Cable Tension Control” window, the cable tension is set to 850 pounds.	At the “Situation Awareness” window, the cable tension is set to 850 pounds.	Verify that the cable tension value of 850 pounds is displayed: Pass/Fail
101	The Instructor checks that the 2 ft/sec light goes out.		
102	On the “Cable Tension Control” window, click on the Hover button.	At the “Cable Tension Control” window, the green Hover button indicator is on.	Verify that the green Hover button indicator is on: Pass/Fail
103		At the “Situation Awareness” window, the cable tension is set to 1500 pounds.	Verify that the cable tension value of 1500 pounds is displayed: Pass/Fail
104	On the “Trafficator Lights” window, click on the amber trafficator light.	At the “Situation Awareness” window, the amber trafficator light is displayed.	Verify that the amber trafficator light is displayed: Pass/Fail
105	The Pilot maintains the helicopter in a stable hover position		
106	The Pilot monitors the natural horizon and horizontal reference bars, and evaluates the ship deck motion for a steady period.		
107	The Pilot controls the helicopter to low hover over the RSD.		
108	The Pilot monitors the ship deck position relative to hangar line-up lines		

No.	Steps	Response	Verification
109	The Pilot monitors the fore/aft positions with updates from the Instructor (NFC), makes aircraft position adjustments, and maintains the helicopter in a stable hover position.		
110	The Pilot calls: “Ready to land”.		
111	If the Main Probe will not enter the RSD, the Instructor transmits position corrections with calls: “Left”, “Right”, “Ahead”, “Back”, “Up”, “Down”, or “Steady”.		
112	If the ship deck motion is not steady, the Instructor awaits the next steady period.		
113	The Instructor calls: “Land now, down down down”.		
114	On the “Trafficator Lights” window, click on the green trafficator light.	At the “Situation Awareness” window, the green trafficator light is displayed.	Verify that the green trafficator light is displayed: Pass/Fail
115	The Pilot ensures that the green trafficator light is on.		Verify that the Pilot can see the green trafficator light in the HMD: Pass/Fail
116	On the “Cable Tension Control” window, click on the Max button.	At the “Cable Tension Control” window, the green Max button indicator is displayed.	Verify that the green Max button indicator is displayed: Pass/Fail
117		At the “Situation Awareness” window, the tension is set to	Verify that the cable tension value of 4000 pounds is displayed:

No.	Steps	Response	Verification
		4000 pounds.	Pass/Fail
118	The Pilot lands the helicopter on the ship flight deck.		
119	The Instructor observes that the helicopter has landed on the ship flight deck.		Verify that the helicopter has landed: Pass/Fail
120	The Instructor observes that the Main Probe has entered the RSD capture area.		
121	On the "Trap Control" window, click on the RSD trap.	At the "Trap Control" window, the RSD trap is closed.	Verify that the RSD trap is closed: Pass/Fail
122		At the "Situation Awareness" window, the RSD red flag is up.	Verify that the RSD red flag is up: Pass/Fail
123	If the green Helo in trap indicator is not on, perform the next four steps.		
124	On the "Trap Control" window, select the Max button.	At the "Situation Awareness" window, the tension is set to 4000 pounds.	Verify the cable tension value of 4000 pounds is displayed: Pass/Fail
125	On the "Trap Control" window, click on the RSD trap.	At the "Trap Control" window, the RSD trap is closed.	Verify that the RSD trap is closed: Pass/Fail
126		At the "Situation Awareness" window, the RSD red flag is up.	Verify that the RSD red flag is up: Pass/Fail
127	If the helicopter trapped indicator is not on, initiate		

No.	Steps	Response	Verification
	lashing routine.		
128	The Instructor calls: “In the trap, trapped, down tail probe”		
129	On the “Trafficator Lights” window, select the amber trafficator light.	At the “Situation Awareness” window, the amber trafficator light is displayed.	Verify that the amber trafficator light is displayed: Pass/Fail
130	On the “Hauldown Control” window, click on the Tail Probe Down button.	At the “Helo Status” window, the Tail Probe Down indicator is displayed.	Verify that the Tail Probe Down indicator is displayed: Pass/Fail
131	The Instructor calls: “In the rails”.		
132	On the “HelMET IOS” window, click on the “Pause” button.	The yellow HelMET IOS Status and Pause button indicators are displayed. An example of the HelMET IOS Pause window is shown in Figure 11.	Verify that the yellow HelMET IOS indicator is displayed: Pass/Fail Verify that the yellow Pause button indicator is displayed: Pass/Fail
133	On the “HelMET IOS” window, click on the “Stop” button.	A “HelMET IOS” window with the Close button is displayed.	Verify that the “Close” button is displayed at the “HelMET IOS” window: Pass/Fail
134	On the “HelMET Pilot Control” window, click on the Platform Control “Stop” button to remove power to the Motion Platform Subsystem EMS motors.	The “System Busy” window is displayed for a few minutes.	
135	Press the Stop button located at the Instructor Operator Station.		Verify that the green L2 MOTION POWER ON Light indicator, located on the Electrical Power

No.	Steps	Response	Verification
			Control Panel, is not illuminated: Pass/Fail
136	At the Nvis SX60 Front Control Box, turn off the power supply by depressing the power on/off button.		
137	On the “HelMET Pilot Control” window, select the Video Settings from the Settings pull down menu.	The “Video Settings” window is displayed on the IOS display monitor.	Verify that the “Video Settings” window is displayed: Pass/Fail
138	On the “Video Settings” window, click on the “Monitor” button.	The “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window is displayed on the IOS display monitor.	Verify that the “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window is displayed on the IOS display monitor: Pass/Fail
139	On the “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window and click the “Yes” button.	The “If the video output is changed while the goggles are still on, severe damage to the goggles will occur. Has the VR goggle control box been turned off?” dialog window is closed.	
140	On the “Video Settings” window, click on the “Close” button.	The “Video Settings” window is closed.	Verify that the “Video Settings” window is closed: Pass/Fail
141	On the “HelMET IOS” window, click on the “Close” button.	The “Save missions for later review?” dialog window is displayed. An example of the “Save missions for later review?” dialog window is shown in Figure 13.	Verify that the “Save missions for later review?” dialog window is displayed: Pass/Fail

No.	Steps	Response	Verification
142	On the “Save missions for later review?” dialog window, click on the “Yes” button.	The “Save missions for later review?” dialog window is closed.	Verify that the “Save missions for later review?” dialog window is closed: Pass/Fail
143		The “Enter the name of the file to save the mission” window is displayed. An example of the “Enter the name of the file to save the mission” window is shown in Figure 14.	Verify that the “Enter the name of the file to save the mission” window is displayed: Pass/Fail
144	On the “Enter the name of the file to save the mission” window, enter a filename with extension (e.g. hauldown_1.log) and click on the “OK” button.	The “Enter the name of the file to save the mission” window is closed and the “HelMET IOS” window with an “End Session” icon is displayed. An example of the HelMET IOS window is shown in Figure 12.	Verify that the “Enter the name of the file to save the mission” window is closed and the “HelMET IOS” window with an “End Session” icon is displayed: Pass/Fail
145	On the “HelMET IOS” window, click on the “End Session” icon.	The “The master has closed the session” window is displayed. An example of the “The master has closed the session” window is shown in Figure 15.	Verify that the “The master has closed the session” window is displayed: Pass/Fail
146	On the “The master has closed the session” window, click on the “OK” button.	The “The master has closed the session” window is closed.	Verify that the “The master has closed the session” window is closed: Pass/Fail
147	On the “HelMET IOS” window, click on the “Review Missions” icon.	The “HelMET IOS” window with a list of filenames is displayed.	Verify that the “HelMET IOS” window with a list of filenames is displayed: Pass/Fail

No.	Steps	Response	Verification
148	On the “HelMET IOS” window, select the previously entered filename (e.g. hauldown_1.log) and click on the “OK” button.		
149	On the “HelMET IOS” window, select the LSO Model: EyePoint from the Available Viewpoints.	The LSO Model viewpoint is displayed on the “HelMET IOS” window. An example of the “HelMET IOS” window is shown in Figure 16.	Verify that the LSO Model viewpoint is displayed on the “HelMET IOS” window: Pass/Fail
150	On the “HelMET IOS” window, select the double right arrow button to replay at a fast forward speed.	The LSO Model viewpoint is redisplayed at a fast forward speed.	Verify that the LSO Model viewpoint is redisplayed at a fast forward speed: Pass/Fail
151	On the “HelMET IOS” window, click on the “Close” button.		
152	On the “HelMET IOS” window, click on the “Exit” icon.	The “HelMET IOS” window is closed.	Verify that the “HelMET IOS” window is closed: Pass/Fail
153	On the “HelMET Pilot Control” window, click on the “Exit” icon.	The “HelMET Pilot Control” window is closed.	Verify that the “HelMET Pilot Control” window is closed: Pass/Fail
154	The Instructor removes the headset and microphone		
155	The Instructor requests the Pilot to close his eyes for a few seconds.		
156	After a few seconds, the Instructor requests the Pilot to		

No.	Steps	Response	Verification
	remove the HMD.		
157	The Instructor places the HMD in a holder at the back of the pilot’s seat.		
158	The Instructor helps the Pilot to remove the safety harness.		
159	The Instructor helps the Pilot step down from the Motion Platform.		

5.3.1.5 Test Inputs

The test inputs for the Daytime Hauldown test case are described in Table 6.

5.3.1.6 Expected Test Results

The expected test results for the Daytime Hauldown test case are described in Table 6.

5.3.1.7 Criteria for Evaluation Results

The following criteria are used to evaluate results:

- The pilot has landed the helicopter on the flight deck using the messenger cable in a virtual environment.
- No failure has been found in the test case.
- If failures have been found, the test case must be repeated.

5.3.1.8 Assumptions and Constraints

The following assumptions and constraints are applicable:

The pilot is a qualified maritime helicopter pilot. The pilot must be familiar with the CH 124 Sea King Helicopter Aircraft Operating Instructions.

The pilot must be familiar with Canadian shipborne helicopter operating procedures.

The Instructor must be familiar with Canadian shipborne helicopter operating procedures and the CH 124 Sea King Helicopter Aircraft Operating Instructions.

The Instructor assumes the roles of Bridge, OOW, SAC, ASAC, FLYCO, and LSO in a scenario.

All simulated models work according to Canadian shipborne helicopter operating procedures.

6 Notes

6.1 Abbreviations and Acronyms

Item	Descriptions
AC	Alternating Current
ASAC	Anti-Submarine Air Controller
ASW	Anti-Submarine Warfare
C	Centigrade or Celsius
CF	Canadian Forces
CFB	Canadian Forces Base
CFTO	Canadian Forces Technical Order
CL	Centreline Light
COTS	Commercial Off The Shelf
CPF	Canadian Patrol Frigate
DOF	Degrees of Freedom
DOS	Disk Operating System
DRAM	Dynamic Random Access Memory

Item	Descriptions
DRDC	Defence R&D Canada
DSL	Deck Status Lights (also known as trafficator lights)
FAF	Final Approach Fix
FDFL	Flight Deck Flood Lights
FLYCO	Flying Co-ordinator
FP	Flying Pilot
FOV	Field of View
FTP	File Transfer Protocol
GUI	Graphical User Interface
IOS	The operator or person controlling the VR Simulator
HDL	Helicopter Deck Landing
HDLS	Helicopter Deck Landing Simulator
HelMET	Helicopter Maritime Environment Trainer
HFL	Hangar Face Light

Item	Descriptions
HLA	High Level Architecture
HMD	Head Mounted Display
HRS	Horizontal Reference System
HTL	Hangar Top Light
HUD	Head Up Display
ICS	Internal Communication System
ID	Identification
IFBT	In Factory Baseline Testing
IOS	Instructor Operator Station
kts	knots
LED	Light Emitting Diode
LSO	Landing Signals Officer
N/A	Not Applicable
nmi	Nautical Miles

Item	Descriptions
NFC	Non-Flying Crew
NFP	Non-Flying Pilot
OOW	Officer of The Watch
OSD	Operational Sequence Diagrams
PC	Personal Computer
PDV	Post Delivery Validation
PROM	Programmable Read Only Memory
RAST	Recovery Assist Secure Traverse
RCVR	Recovery
RGB	Red Green Blue
RHS	Reconfigurable Helicopter Simulator
RTI	Run Time Infrastructure
RSD	Recovery Securing Device
SAC	Shipborne Air Controller

Item	Descriptions
SGI	Silicon Graphics Inc.
SHINCOM	Ship Integrated Communication System
SHOP	Shipborne Helicopter Operating Procedures
SPS	Software Product Specification
STD	Software Test Document
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
UPS	Uninterruptible Power Source
VAC	Voltage Alternating Current
VDD	Version Description Document
VFR	Visual Flying Rule
VLP	Virtual Lesson Plan
VLS	Vertical Landing Speed
VR	Virtual Reality
VR-Sim	Virtual Reconfigurable Simulator

6.2 Glossary

Term	Definition
Briefing	The period in which an instructor provides a pilot with information regarding the current mission plan prior to a training exercise.
Debriefing	The period in which an instructor provides feedback to the pilot on his/her performance during the training exercise.
Exercise	The period between briefing and debriefing when a pilot execute missions while an instructor monitors progress.
Delta Hover	The helicopter is holding a pattern of 2-180 degree turns in a large oval about 1 nautical mile back of the ship at an approximate altitude of 200 feet at a speed of 70-90 knots. Where fuel efficiency is required, 70 knots is chosen.
Delta Hover Astern	The helicopter is flying at a pattern of approximately 45 degrees off the ship stern quarter at a distance of 2.5-3 rotor arcs at an altitude of 40-60 feet.
Federate	A High Level Architecture term describing a single executable in a federation.
Federation	A High Level Architecture term describing a collection of federates all working together during a training exercise.
High Hover	The helicopter is flying at a pattern of 20-25 feet above the deck as if one were sitting on the top edge of the hangar face with feet dangling down.
High Hover Starboard of The RSD	The helicopter is flying at a pattern of high hover altitude but aligned with the starboard traffic indicator, nets directly below the starboard side of the helicopter.
Individual/Participant	A single person involved in the training session. An individual can act as either a pilot or an instructor.

Term	Definition
Instructor	A person who will brief a pilot on a given mission plan, monitor progress, then provide performance feedback during a debriefing.
Lashing	Lashings consist of a minimum of four chains (attached to separate tie-down rings) to prevent movement or rotation of the helicopter. When it is intended to shut down the helicopter, or if the ship motion exceeds 1 degree pitch and 3 degree roll, aircraft-to-deck chain lashing are to be installed immediately after landing and removed prior to take-off.
Lower Hover	The helicopter is flying at a pattern of centring over the RSD at altitude high enough such that the tail wheel is maintained safely above the moving deck.
Master	A player (instructor) role in which the mission plan is selected, configured, started, stopped, and paused for all other roles.
Mission	An attempt by the players to achieve the objectives outlined in the mission plan. There can be multiple missions within a training exercise.
Mission Plan	A mission plan is an instance of the scenario with assigned parameter values.
Non-Flying Crew (NFC)	The Non-Flying Crew (NFC) include all those in the helicopter that are not actively flying the aircraft, including the non-flying pilot (co-pilot) and persons in cabin compartment.
Player	A special interactive role involved directly in the execution of a training exercise. Such a role can be adopted by an operator through the use of a simple graphical user interface terminal, or by a student through either a terminal or a virtual environment.
Logging	The storing of federate data required for playing back in a training exercise.

Term	Definition
Role	A function or responsibility assumed by an individual during the training simulation. A single individual can have many concurrent roles.
Scenario	A specific configuration of players acting together to perform a series of objectives under conditions described by mission parameters.
Session	A session is active once a mission plan has been selected, all participants have connected together, and all roles have been assigned.
Signal Charlie	It means cleared to make an approach to hover over the deck and lower the messenger cable; it is not clear to land.
Slave	A non-master player role executed in a training exercise. A slave is normally controlled by the master.
Student	An individual to be trained using the Helicopter Deck Landing Simulator. A student can only assume a single player role (e.g. pilot).
Terminal	A Graphical User Interface (GUI) display monitor with keyboard and mouse used by an individual for assuming a given player role in a training exercise.

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(U) The Helicopter Maritime Environment Trainer (HelMET) was developed by Defence R&D Canada – Toronto (DRDC Toronto) for training helicopter pilots to land on the flight deck of a Canadian Patrol Frigate (CPF) in a virtual environment. The HelMET was installed at 12 Wing, Canadian Forces Base (CFB) Shearwater, Nova Scotia, Canada [reference: Summary per document cited in next paragraph].

DRDC Toronto Document: CR2002−027 Atlantis Document: ED990−01155 titled Helicopter Maritime Environment Trainer: Software Test Description documented Version 1.1 of the HelMET Software.

As third party support for the HelMET system did not come to fruition, DRDC Toronto has been supporting the HelMET system at 12th Wing Shearwater with hardware and software updates. The current version of HelMET is Version 4.4. Many of the updates implemented were made to allow the simulator to be used as a procedures trainer.

This document is a revision of CR2002−027 updated to reflect the large number of changes that have been implemented by DRDC Toronto since version 1.1. The purpose of this document is to update the description so that the system can be maintained and operated by Director Aerospace Development Program Management, Radar and Communications Systems or its representatives.

(U) Le Simulateur d’entraînement virtuel pour hélicoptère maritime (HelMET) a été développé par Recherche et développement pour la défense Canada – Toronto (RDDC Toronto) afin d’entraîner les pilotes d’hélicoptère à l’atterrissage sur le pont d’envol d’une frégate canadienne de patrouille dans un environnement virtuel. Le système HelMET a été installé à la 12e Escadre, Base des Forces canadiennes Shearwater, Nouvelle Écosse, Canada [référence : sommaire par document cité dans le paragraphe suivant].

Document RDDC Toronto : CR2002 027, document Atlantis : ED990 01155 intitulé Simulateur d’entraînement virtuel pour hélicoptère maritime : Description de test de logiciel, documentation de la version 1.1 du logiciel HelMET.

Étant donné que la prise en charge du système HelMET par un tiers ne s’est pas réalisée, c’est RDDC Toronto qui en assure, par conséquent, le soutien à la 12e Escadre Shearwater au moyen de mises à niveau de matériel et de mises à jour de logiciel. La dernière version du logiciel HelMET est la version 4.4. De nombreuses fonctionnalités qui ont été implémentées visaient à permettre au simulateur d’être utilisé comme système d’entraînement aux procédures.

Le présent document est une révision du document CR2002 027 dont la mise à jour vise à refléter le grand nombre de modifications apportées au logiciel par RDDC Toronto depuis la version 1.1. L’objectif de ce document est de mettre à jour les descriptions de façon à ce que le système puisse être maintenu et utilisé par le Directeur – Gestion du programme de développement aérospatial (système de radar et de communication) ou ses représentants.

14. KEYWORDS, DESCRIPTORS or IDENTIFIERS (Technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document. They should be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included. If possible keywords should be selected from a published thesaurus, e.g. Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus identified. If it is not possible to select indexing terms which are Unclassified, the classification of each should be indicated as with the title.)

(U) Helicopter, Deck landing, Virtual Reality Simulator, Team Trainer, CPF Frigate; Sea King

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